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Electric Railway Journal

Volume 59

January to June, 1922

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accidents (including wrecks)
Safety first
Storm and fire damage

CARS AND OTHER VEHICLES

Automobiles
Cars (including car design)
Locomotives
Motor buses
Motor cars, Gasoline
Motor trucks
Service and tower trucks
Trackless trolley
Work and wrecking cars

CAR EQUIPMENT

Bearings
Brakes and compressors
Current collection
Electrical equipment
Fixtures
Gears and pinions
Motors
Trucks
Wheels and axles

EMPLOYEES

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Labor
Strikes and arbitrations
Wage decreases
Wages and working agreements

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Fare decreases
Fare increases
Fares
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Traffic stimulation

FINANCIAL, LEGAL AND STATISTICS

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Accounting
Appraisal of railway property
Financial
Franchises
Insurance
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Service at cost
Statistics
Taxes

HEAVY ELECTRIC TRACTION

Heavy electric traction (general)
Locomotives

MAINTENANCE OF EQUIPMENT

Insulating materials
Lubrication
Maintenance practice
Metals
Purchases
Repair shop practice
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

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Power generation
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Substations and equipment
Switchboards and equipment

STRUCTURES

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Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals
Waiting stations

TRACK

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Rails
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Ties
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Track maintenance

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Schedules and timetables
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Management
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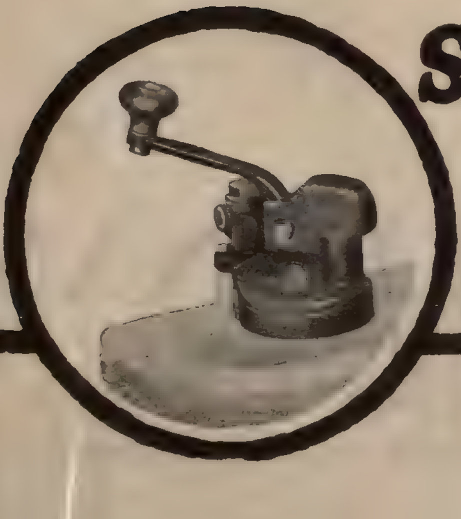

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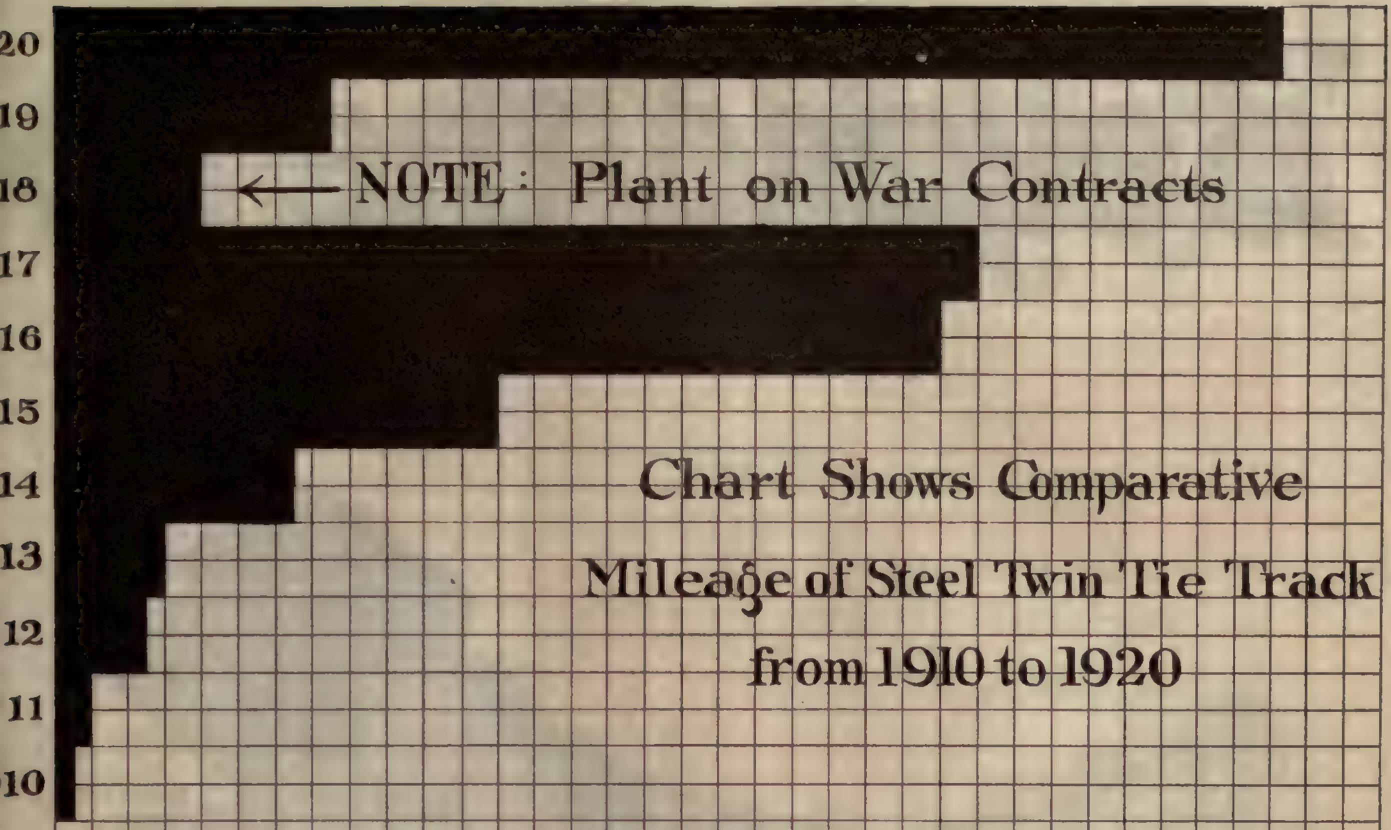

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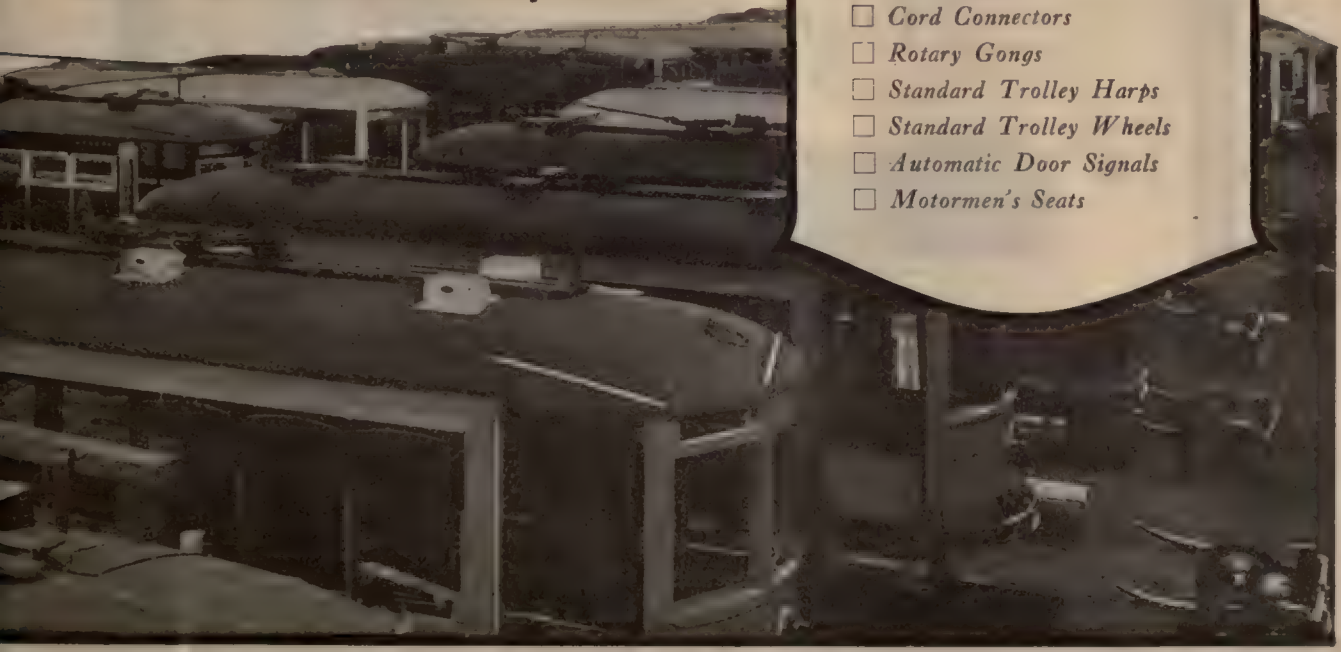

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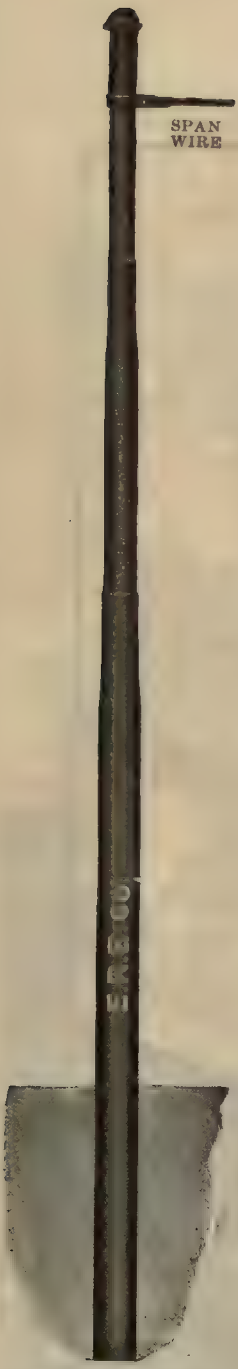


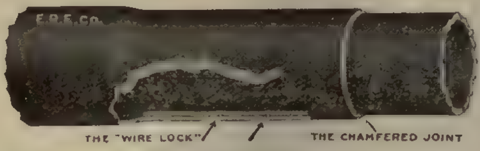
Plain Tubular Steel Pole

The committee on power distribution of the A. E. R. A. recommended tubular steel poles. The ELRECO tubular steel pole stands preeminent.

ELRECO poles may be set without regard to the direction or strain of the load to be carried—applying any load to an ELRECO at right angles to its length produces the same strain regardless of the direction in which the load is applied—they possess great reserve strength. You can save the additional pole necessary on curves or corners by using ELRECO steel poles.

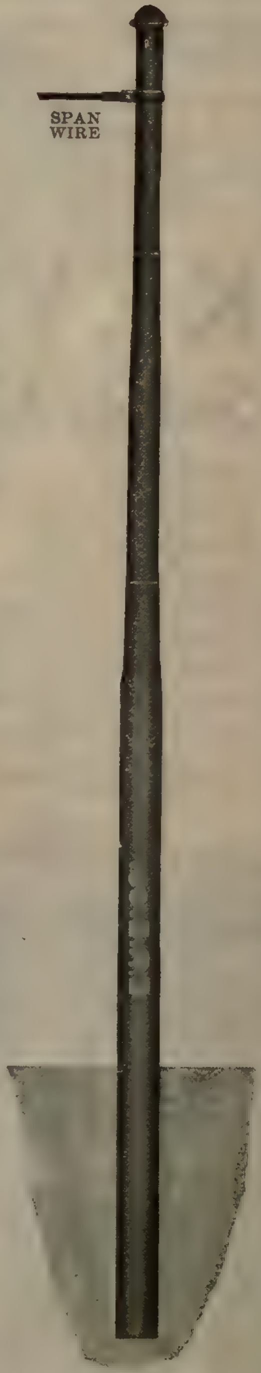
They have no angles or pockets to retain moisture—they have no corners accessible to corrosion—they are most accessible to painting and they lend themselves most readily to combination railway and lighting purposes.

Patented Wire Lock Swedge Joint



ELRECO poles are assembled with our well known Patented Wire Lock Swedge Joint. The edge of the outer tube is chamfered, so that water can not rust and corrode the pole at this joint.

It is impossible for poles made up in this manner to telescope at the joints, either by overloading or by the drop test.



Plain Tubular Steel Pole

The Electric Railway Equipment Co.
Cincinnati, Ohio
New York Office: 30 Church Street

Modernize! *Pneumatize!*

Both Doors, Please!

How cheerfully that comes from the conductor on a pneumatized car!

He isn't thinking about saving some extra work for himself while causing some extra delay to his car.

Since his car has been pneumatized it's easier for him to give his passengers the full platform width for rush-load entrance than it formerly was to give them only *half* that width.

And he knows that when those doors close there isn't the slightest possibility that the doors or steps will trap a flying-leap passenger; or that the car will start before the doors themselves, through their *full* closing have given the starting signal or even the starting *impulse*.

It's two or more of this combination:

National Pneumatic

Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

They make possible the pleased conductor, the safe-guarded passenger and the top-schedule car. May we help you select the right members of the National Pneumatic Rushour Line?

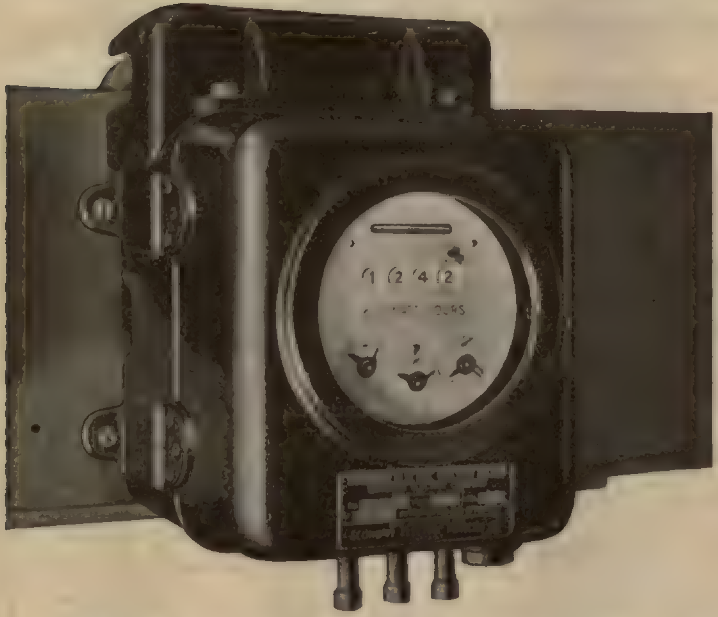
Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
Originator and Manufacturer
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

ECONOMY POWE

Announcing

A RENTAL-PAYMENT PLAN



You can now buy a complete equipment of Economy Meters at a monthly rental of less than one half the value of the power you will be certain to save.

Under this plan the devices earn more than twice the rental and become your property in two years.

Let us show you an estimate of savings and, operating and rental costs for your conditions.

The Economy Meter saves power at the car and labor at the car house.

METER THE ENERGY—

SAVING **METERS**

Standard on nearly 100 Roads
Saving 1/3 to 1/2 cent per Car Mile

Economy Meters are in successful power-saving service on roads having equipment ranging from 4000 H.P. electric locomotives to 50 H.P. Birney Safety Cars

Some 1921 Installations

Allegheny Valley
Buffalo & Lake Erie
Cincinnati Traction Co.
Claremont Railway
Denver Tramway Co.
East St. Louis
Empire State Ry.
Evansville & Ohio Valley
Ft. Wayne,, Van Wert & Lima
London & Port Stanley
New York, New Haven and Hartford
Omaha, Lincoln & Beatrice
Pennsylvania-Ohio Elec. Co.
Quincy Railway Co.
Sacramento-Northern
Seattle & Ranier Valley
Southern Pennsylvania
Union St. Ry., New Bedford
Washington-Virginia Ry.
Wichita Ry. & Lt. Co.
Citizens Traction Co.
Interstate Public Service Co.
Holyoke Street Railway
Morris County Traction Co.
Tulsa Street Railway Co.
Indianapolis & Louisville Traction Railway Co.
Indiana Railways & Light Co.

And substantial Repeat Orders from more than 15 other roads.

ECONOMY
Power-Saving Meters
tell you—

1. WHO are your careful, economical motormen.
2. WHICH motormen need instruction in proper handling of car equipment.
3. HOW much power is being saved by motormen collectively and individually, by direct reading units of power.
4. HOW much power is being used on any section of your lines.
5. HOW much power is being used in trailer service.
6. HOW much power your freight and express service is using.
7. HOW much power is being used for switching and car movements in yards.
8. WHAT is the line loss on your D.C. distribution.
9. WHEN your schedule speeds are too high or to low.
10. WHAT is the most economical equipment for any service.
11. WHAT are the proper gear ratios for given service conditions.
12. WHEN each car should be inspected.

The Economy Meter with inspection dials is readily adaptable to any electric car or locomotive operating conditions. It is the only power-saving device whose unit is correct for use in determining when cars should be inspected.

ECONOMY ELECTRIC DEVICES COMPANY
L. E. GOULD, Pres., Old Colony Bldg., Chicago
Cable Address: Sangamo, Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco
Burton R. Stare Co., Seattle
J. G. Monahan, Los Angeles
Ludwig Hommel & Co., Pittsburgh
Grayson Railway Supply Co., St. Louis

-THAT'S WHAT YOU WANT TO SAVE

A Great Educational Institution

FOUNDED on the principle of service and dedicated to the engineering industries, the McGraw-Hill Company is in fact a great educational institution. It provides a post-graduate course for the whole engineering fraternity.

It is also a commercial organization, the largest of its kind, with customers all over the world. Its products are eleven engineering and business publications, each a leader in its field.

Not all have stopped to analyze how this strength and leadership came to be. Many answers may be given but two facts stand out above all others.

First, the industries and readers selected are those upon which the growth and prosperity of the nation depend.

Second, the editorial service to those men and industries is of the highest type that experience, brains and money can produce.

Another McGraw-Hill contribution to industrial education is the publication of technical and business books by a related institution, the
McGraw-Hill
Book Company
370 Seventh Avenue
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Tenth Avenue at 36th Street, New York
Member of Associated Business Papers, Inc.

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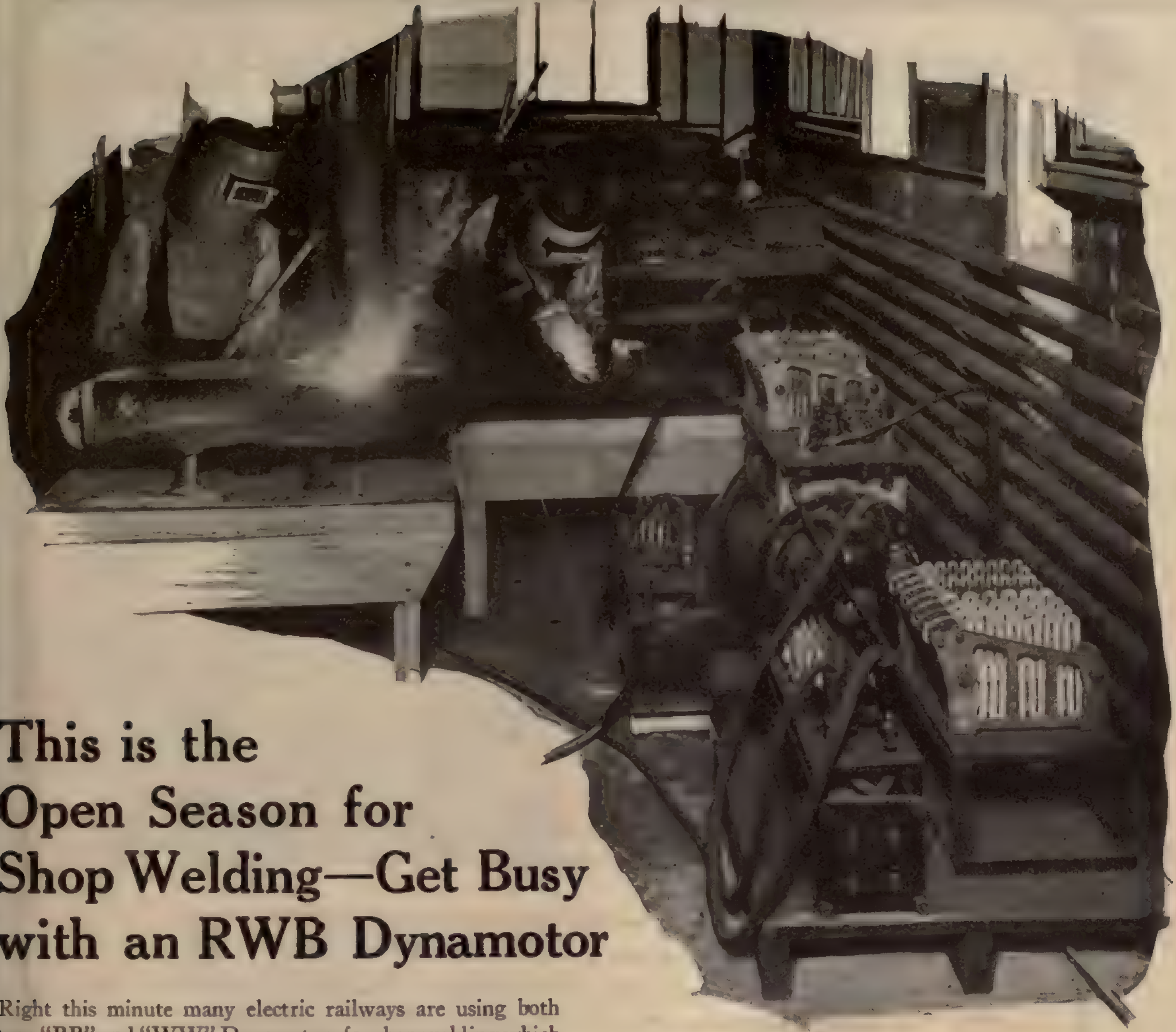
St. Louis: 713 Star Bldg.
San Francisco: Rialto Bldg.
London: 6 Bouverie St., London, E. C., 4

Chicago: 1570 Old Colony Bldg.
Philadelphia: Real Estate Trust Bldg.
Cleveland: 533 Leader-News Bldg.
Buenos Aires: Calle Corrientes 685



Two operators welding from type "WW" Dynamotor, Worcester Consolidated Street Railway Company Shops.

This is the Open Season for Shop Welding—Get Busy with an RWB Dynamotor

Right this minute many electric railways are using both type "BB" and "WW" Dynamotors for shop welding which includes building up flanges on steel car wheels, repairing gears, gear cases, truck yokes, shafts, etc. As both Dynamotors are used for shop and track use, this valuable reclamation work is being done during bad weather when road work is suspended. For track work, the type "WW" Dynamotor is mounted on a two-wheel cart and conveniently employed to weld Carbon Arc Welded Rail Joints. These are extensively used because of their simplicity of installation—low cost—and permanence.

While the type "BB" Dynamotor is not large enough for rail joint welding its additional portability (being mounted on three small track wheels) causes it to be widely used for rail bonding. Furthermore, both machines are particularly adapted for all kinds of metallic building up work, such as worn and cupped rails, hard centers and manganese special work.

An RWB Dynamotor can be kept busy every moment and when needed the capacity of the type "WW" permits two operators to weld simultaneously, as illustrated. All these uses produce savings which no electric railway can afford to overlook.

Send us your address—
we'll mail you details
of the equipments.

Rail Welding and Bonding Company

Formerly The Lincoln Bonding Co.

RWB

Cleveland, Ohio.

New York Office
30 Church Street

Chicago Office
343 So. Dearborn St.

One Way to Reduce
The Cost of Doing Business

A big bank in New York City says delays in turnover cost American Business $11,500,000 for interest each day of 1920. This charge was imposed by delays in shipments, delays in collections and the cost of capital invested in excessive stocks and slow moving goods on dealers' shelves.

There is going to be an interest bill for each day of 1922.

But

It is within the power of each buyer of electrical goods to limit his contribution to it. He can hold down his investment by using our stocks for his reserve. His interest charges will be less. The turnover of his working capital will be faster. He will earn more with a lower investment.

Everything he needs can be delivered quickly from the complete stocks of standard goods at our Distributing House near him. There are 48 of these Houses located in centers of trade and transportation throughout these United States.

Their stocks and location can assist every buyer to obtain maximum turnover with minimum investment of working capital whether he buys for his own use or for resale.

A National Electrical Service

Western Electric Company

OFFICES IN ALL PRINCIPAL CITIES

Two Percent Annual Depreciation on Bates Poles Attracts Lapland Railway

Low Initial Investment was Prime Consideration

The Royal Swedish State Railway has equipped certain high speed sections of their system in Lapland with Bates One-Piece Steel Poles.

Bates Poles are used in all parts of the world because of their extraordinary long life, and because the unique patented principle of the One-Piece expansion results in greater pole strength per pound of steel than any other railway pole.

The important features of Bates Poles are these:

That every rustable surface can be reached by the paint brush. Surface corrosion can be so definitely reduced by ordinary paint maintenance that after 50 years' service the poles should be strong and trim.

Below the ground corrosion is stopped entirely because the butt of the pole is encased in concrete. This interlocking mass of steel and concrete makes an ideal foundation, preventing pole rotation or deflection from the severe stresses prevalent in extreme climates.

You must understand the unique mechanical principles by which Bates One-Piece Poles are created to fully realize that long life and sound service are inherent and logical, rather than exaggeration.

Send for our 1921 Steel Pole Treatise.

Bates Expanded Steel Truss Co.
208 So. La Salle St., Chicago, U. S. A.

Bates Poles Lead in Price, Service, and Longevity

Boston: 628 Old South Bldg.
Rochester: 119 Main Street East
Syracuse: City Bank Bldg.
Buffalo: 601 Ellicott Square
Philadelphia: 1333 Real Estate Trust Bldg.
Pittsburgh: 305 Union Arcade Bldg.
Columbus: Joyce Realty Bldg.
Indianapolis: 518 Traction Terminal Bldg.

Milwaukee: 453 East Water Street
St. Louis: Railway Exchange Bldg.
Minneapolis: 310 Security Bldg.
Denver: 1633 Tremont Street
Salt Lake City: 59 W. Broadway
San Francisco: 589 Howard Street
Los Angeles: 616 Title Insurance Bldg.
Seattle: Hoge Bldg.

Canada: Mussens, Limited, Montreal, Quebec.
Japan: China: China and Japan Trading Co., Ltd., New York and Tokyo
Australia: Fred S. Lee, Sydney, N.S.W.
India: Jost's Engineering Co., Ltd.
Dutch East Indies: Lindeteves, Inc.
England: M. Samuel & Co., Ltd., London, E.C.

BATES ONE PIECE STEEL POLES

2-Way, Type A, Showing Details

Angle Lug.

Elbow.

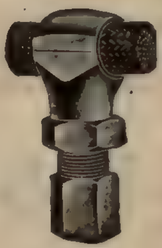
Front Terminal Lug.

Service Box Plug.

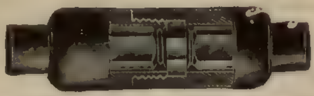
Reducer.

Y-Joint

3-Way Joint.


Dossert Cable Tap such as used in accompanying photograph

Back Lug.


Dossert Insulated Cover, with 2-Way Connector.

Grounding Device Ends for Pipe.

Swivel Lug.

DOSSERT
CONNECTORS

—just two examples of many

on electric railway lines and power stations

How a Dossert 3-way Connector is used on a New York safety car is illustrated in the left hand view; while to the right are shown several Dossert Cable Taps installed in the Great Falls Power Plant, supplying energy to the electric trains of the Chicago, Milwaukee & St. Paul.

Dossert Connectors make solderless labor-saving, safe electric joints. They have a low resistance, and hence heat less than the cables they join.

Our Dossert Catalog No. 15, will suggest many economical applications. Ask for folder on Dossert Connectors in railway signal installations.

DOSSERT & COMPANY
H. B. LOGAN, President,
242 West 41st Street
NEW YORK

U. S.

Electric Signals

Operating cars on single track, without an efficient signal system, will cost you, sooner or later, a good round sum in damages when the inevitable accident occurs. Perhaps you have had one already. Look out for the next!

A very small amount invested now to purchase and install United States Electric Signals will be not only the means of preventing such a disastrous occurrence, but it will enable you also to speed up your line, to operate more cars on quicker schedules without double-tracking and without additional turnouts.

Get our estimate on a complete installation. You need signals!

and

Automatic Track Switches

Type 16

Quick acting electric track switches have become a real necessity in the operation of snappy, up-to-date service, especially where safety cars are used.

Our new Type 16 switch, recently placed on the market after exhaustive tests of many months' service on several Massachusetts roads, is of simplest construction, yet so rugged and so well-protected that maintenance troubles and expense are practically eliminated. The trolley contactor mounts on standard ears—a factor which will appeal to experienced line-men.

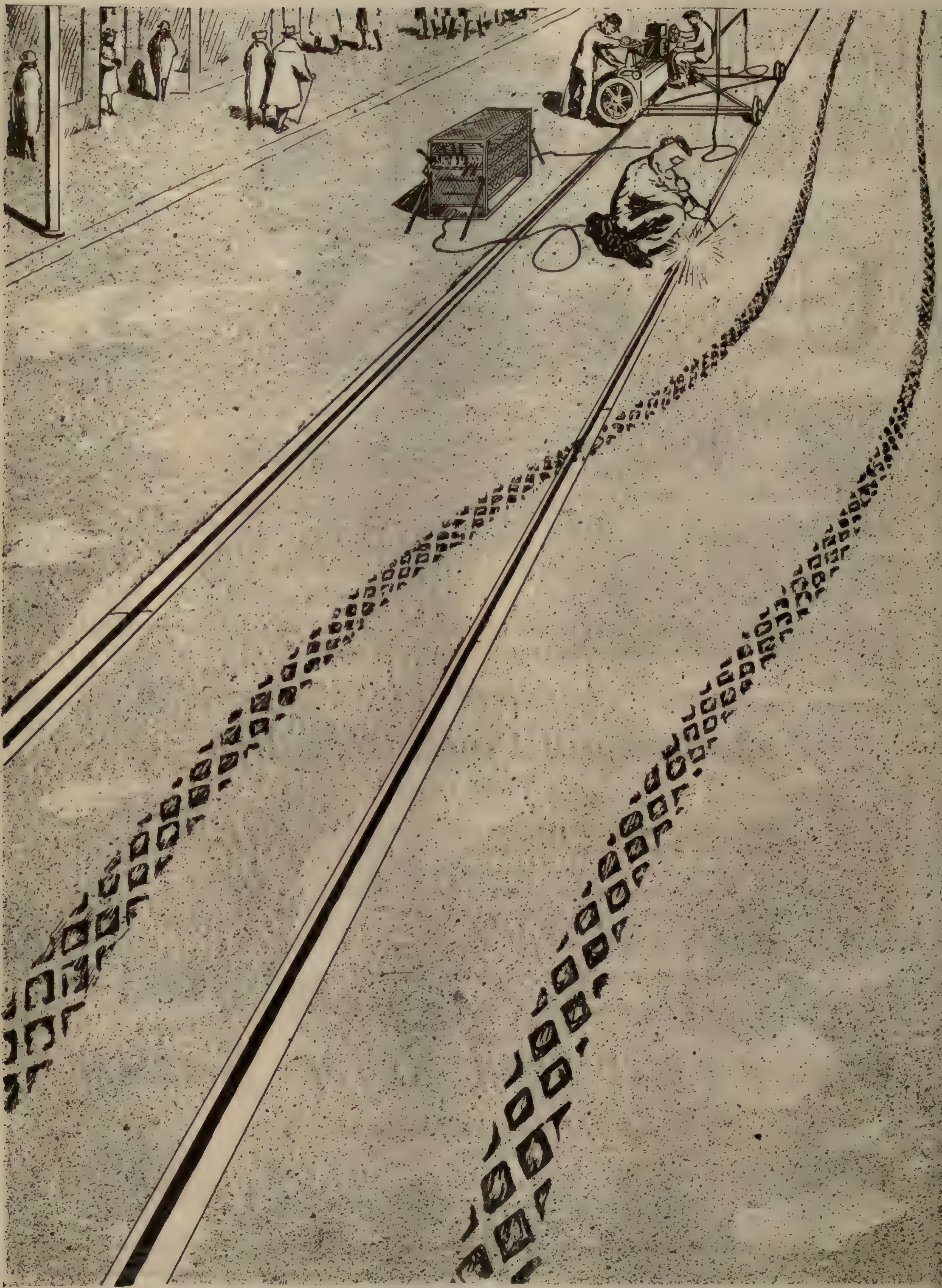
Electric switches—good ones—save time of cars on the road. *Speed up.*

SEND FOR FULL DESCRIPTION AND PRICES

For Faster and Safer Service

United States Electric Signal Company
West Newton, Massachusetts

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign: Forest City Electric Services Supply Co., Salford, England



If You Want to Compete with Rubber Tires in 1922

Smooth Out Your Tracks!

It's riding on rough rails that has driven the public to a great extent, from the street car to the automobile even for the shortest rides and the slightest occasion. It isn't the motor-bus, in its proper place, that you have to fear, it's rubber-tired comfort on level pavements that is competing with you. The private automobile has taken millions from the street railways, to a considerable extent because the latter's long-neglected tracks shake and vibrate cars with nerve-racking effect, and speed is habitually slowed down in order to remain on the rails.

Determine this year to offer your public a faster ride on smooth-running track. Build-up every cupped joint and every battered, broken piece of special work. Then finish off the welds to a fine even surface by grinding. Also grind out those harrowing corrugations. It won't cost much to do a really good thorough job.

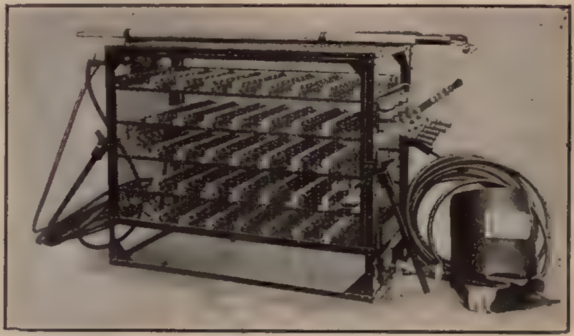
Write us now for quotations on the Ajax Electric Arc Welder, and our well-known line of rotary and reciprocating track grinders.

Railway Trackwork Company
3132-48 East Thompson St., Philadelphia, Pa.

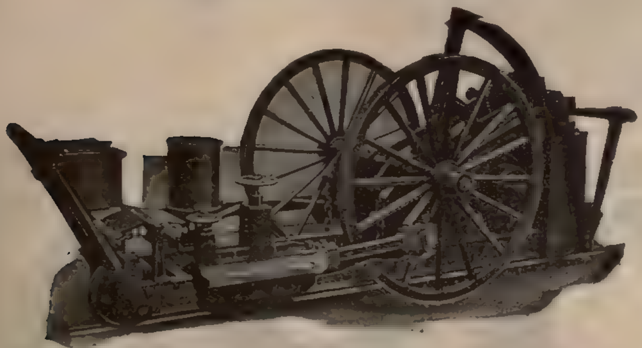
AGENTS:

Chas. N. Wood Co.	Electrical Engineering & Mfg. Co.	Atlas Railway Supply Co.	P. W. Wood
Boston	Pittsburg	Chicago	New Orleans

Universal Rotary Track Grinder



Ajax Electric Arc Welder

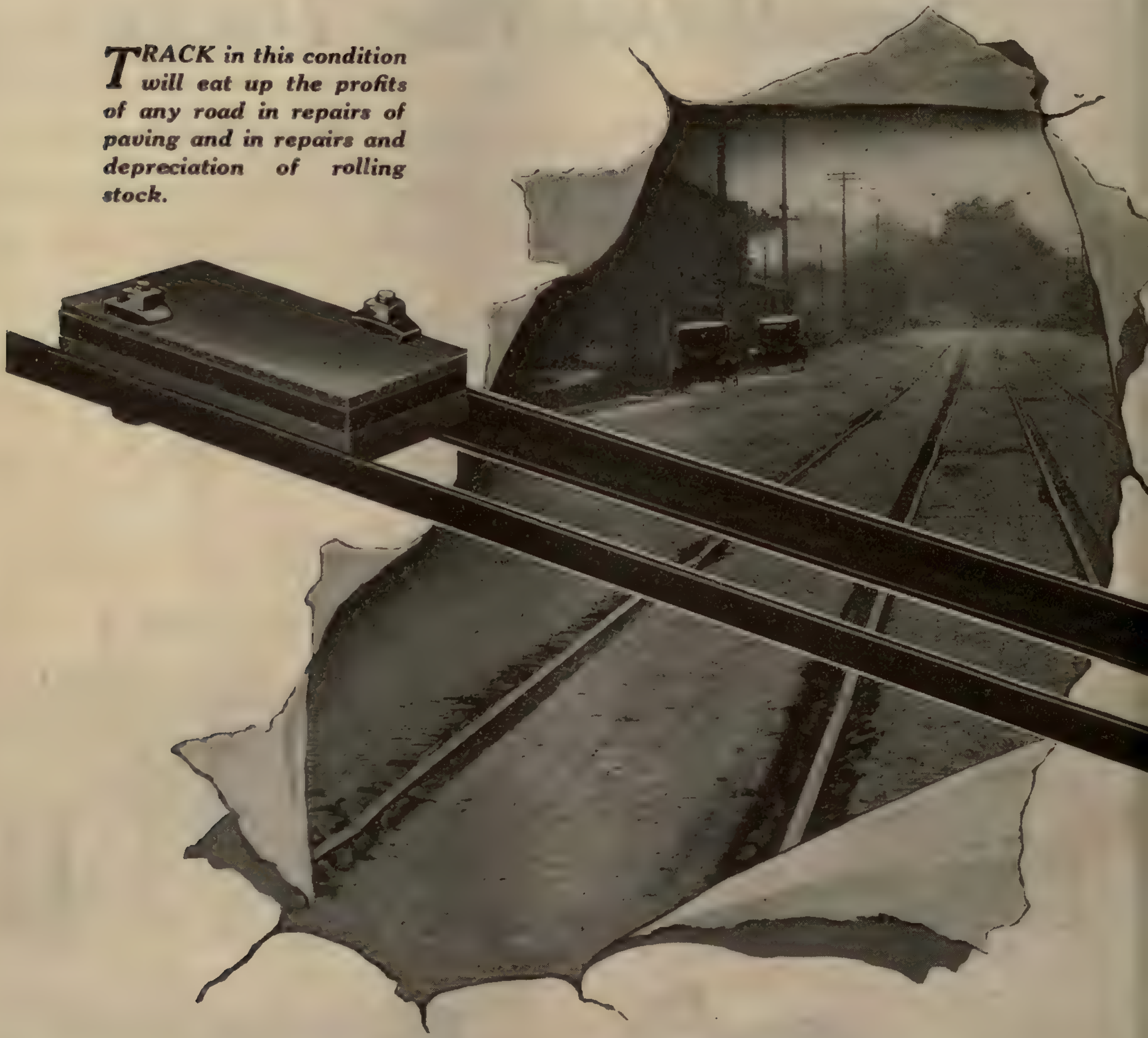


Reciprocating Track Grinder

Atlas Rail Grinder

A run-down track
the repair shop.

TRACK in this condition will eat up the profits of any road in repairs of paving and in repairs and depreciation of rolling stock.



DAYTON

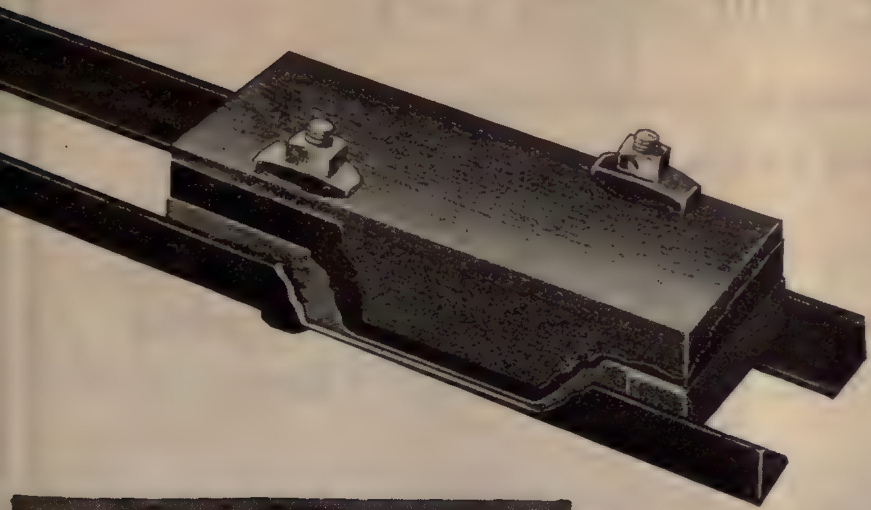
eads straight to

RELAY IT NOW!

Look at this track. Broken and sagging rail joints—humps and depressions everywhere—torn and ragged paving. Your cars as they go bumping and clattering along this street seem to be headed for the terminal at the end of the line but in reality they're making a bee line straight for the repair shop—and they're taking the shortest route to get there.

You can't afford to postpone relaying this stretch of track. It gets worse every day. The damage it does to rolling stock is terrific. It sends the repair and maintenance cost curve over the top.

New track costs money but NO new track costs more. Relay *now* with Dayton Resilient Ties and save $6000.00 per mile over track laid on wood ties in concrete or $2000.00 per mile on track laid on wood ties in gravel ballast.



Resilient
TIE

That's the whole story in a nutshell but get complete data backed by proved results.

The Dayton Mechanical Tie Co.
708 Commercial Bldg., Dayton, Ohio

"It Takes Sand to Win"

But—

Are you using too much Sand?
Sand costs money. How much does it cost you?
Look up the amount you use and the costs.
A 30% to 50% saving may be made.
Which is some saving and still have Sand to Win.

Sand is easy to waste

Track Sanding is usually wasteful but—
Not necessarily so if you desire it otherwise.
There are better methods than average practice.

Take Your Safety Cars

Probably you are using several times the amount of sand really needed. **You can use less. Lots less.**

We shall be glad to inform you how our methods are saving big money for our customers—and **adding instead of detracting from the Safety Features.**

THE NICHOLS-LINTERN COMPANY
8404 Lorain Avenue **Cleveland, O.**

N-L Products manufactured and sold in Canada by Railway & Power Engineering Corporation, Ltd., 133 Eastern Ave., Toronto, Ont.

PERFECT
MICANITE
INSULATOR

REG. U. S. PAT. OFF.

ELECTRICAL INSULATION

The Mica Insulator Company is the pioneer manufacturer of mica product insulation and oiled or varnished fabrics, paper, tapes, tubes, etc. With years of experience, special machinery, a large modern factory, and a staff of manufacturing and technical experts, it is especially equipped to serve every electrical insulation requirment in the electrical railway field.

MICANITE

Armature and commutator insulation; bushings; cloth; commutator segments and rings; fish paper and mica; flexible plate; moulding plate; paper; plate; pressboard and mica; rope paper and mica; tape; tubing; washers.

EMPIRE
Oiled Insulating Materials

Canvas; cloth; duck — oiled and varnished; paper—oiled and varnished; silk; tape; tubes—oiled or varnished.

KABLAK

Black varnished cloths and papers.

LINOLAC

Amber colored insulating varnish.

LINOTAPE

Yellow and black oiled cloth in tape form.

M. I. C. COMPOUND

Black insulating varnish.

MICO

Shellac varnish.

ARMATITE

Fish paper and varnish cambric cloth combined.

MISCELLANEOUS

Fibre—untreated and Horn; glue; paper — red rope, untreated fish, and oiled rope; pressboard—untreated; sleeving—white cotton and varnished; soldering paste; stay binding; tape—friction; untreated cotton and silk, silk and rubber; transformer insulation; twine—armature; washers—built-up mica; webbing.

"Electrical Insulating Materials" is a catalog that every railway repair shop and purchasing department should have for an insulation guide. How many copies shall we send you?

MICA INSULATOR COMPANY

SOLE MANUFACTURERS OF MICANITE

Established 1893

Main Office: 68 Church St., New York. Chicago Office: 542 So. Dearborn St.,

Representatives in Principal Cities 3-F

DIFFERENTIAL CARS

Twenty-Nine

Railways are using them.

Twenty-Nine

Railways like them.

Twenty-Nine

Railways, in all sections of the country, under all sorts of operating conditions, are transporting materials in them with tremendous economy.

THE DIFFERENTIAL STEEL CAR CO.

FINDLAY, OHIO

ECLIPSE

Manufacturers of:

Eclipse Fender
Acme Type Fender
Standard Wheel Guards for Safety Cars
Eclipse Trolley Retriever
Eclipse Trolley Catcher

Prices to Suit the Times.

The Eclipse Railway Supply Company
4824 PAYNE AVENUE
CLEVELAND, O.

TULC "Overall" Specialists work with you to help TULC work for you

We believe that the physical characteristics of every electric railway vary to such an extent that the only true remedy for faulty lubrication is *individual lubricating service.*

The Lubricating Service offered by the manufacturers of TULC is individual. Our calculations are based solely on the requirements of your property.

We have had broad experience in the field, have collected valuable data and that's why we can apply individual service to so many dissimilar properties with consistent, money saving results.

The Service men who work with your oilers—show them how and why TULC should be used and 99 times out of a hundred they get results—the one hundredth time we make no charge for their service.

It doesn't cost but a cent to write for complete data —why not drop us a card today?

***The* Universal Lubricating Co.**
Offices: Schofield Bldg. **Works: Sweeney Ave.**
Cleveland, Ohio

TULC
A LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs

This Year
—for all your cars

Earll

Catchers and Retrievers

With industry well on the mend, and the electric railway business in particular past its darkest days, that deferred maintenance, those postponed improvements and the acquisition of additional rolling stock must all be taken care of. Whether rehabilitating old cars or ordering new ones, it's true economy to equip with Earll Trolley Catchers or Retrievers.

Save Your Lines — Save Your Money

Earll Catchers and Retrievers are the economical ones to use because their rugged practical construction makes maintenance costs almost a negligible factor. Their reliability in functioning properly when the trolley jumps the wire saves many a traffic tie-up, which a torn-down line would cause. The small initial investment necessary for a complete Earll installation is soon repaid in savings.

FOR ORDINARY CITY OR SUBURBAN CARS use the Earll No. 7 or No. 10 Catcher, or the No. 4-A-S Retriever.

FOR HIGH SPEED INTERURBAN CARS use Earll No. 4-A-L or No. 5 A-L Retrievers.

FOR SAFETY CARS use the Earll No. 10 Catcher, or No. 4-A-S Retriever, specially designed for City Service.

Convince yourself—get one for trial.

C. I. EARLL YORK PA.

Yours for a Happy & Prosperous 1922

PNEUMATIC DOOR ENGINES

st Wishes
w Year

PUSH BUTTON CONTROL

Our Warmest Wishes
The New Year 1922

ELECTRIC HEATERS

ew Year Bring You
Happiness
and
Prosperity

THERMOSTAT CONTROL

Ring in the New
with

BELLS AND BUZZERS

ay Your New Year Start
th Health & Happiness

MOTORMAN'S STARTING LIGHTS

from the
Consolidated Car Heating Co.
Albany, New York

CONSOLIDATED CAR HEATING COMPANY

“Save at the spigot— waste at the bung-hole!!”

This trite saying is perhaps more applicable to the purchase of railway lubricants than to any other example one could select.

The few cents per gallon—that may possibly be saved through the purchase of cheap oils—is insignificant, compared with the many dollars that must be spent for repairs and replacements to equipment that become necessary through their use.

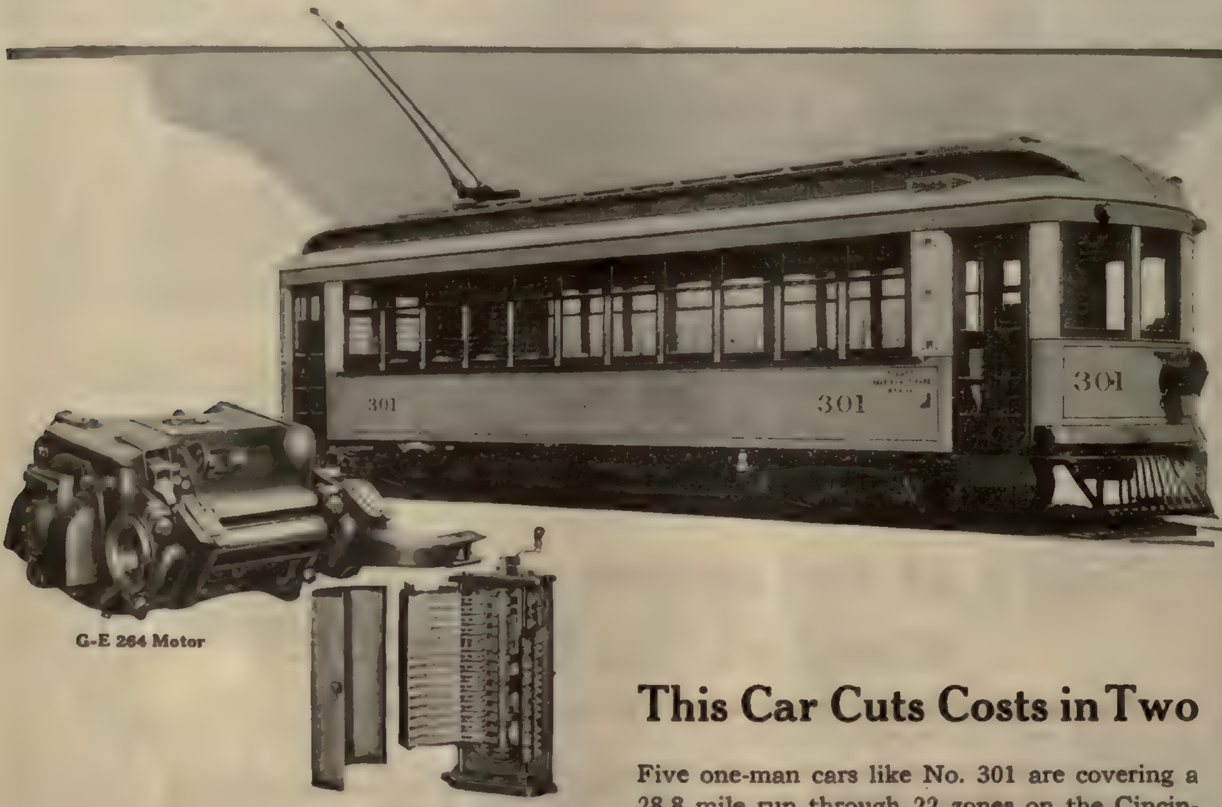
Inferior lubricants carry this penalty—always, without exception; a fact known to mechanical men, as proved by countless tests. Lubricants made from the lower grade crudes may be used safely for many purposes, but *not for railway lubrication*—the very nature of the service required demands *quality!*

And it is the uniform and unvarying high quality of GALENA OILS that enables them to deliver the remarkably efficient lubrication service for which they are noted. This *quality* shows in greater mileage, in reduction of fuel and repair bills, preservation of bearing surfaces, with lessened depreciation in equipment.

It is lubrication—not *oil*—that the street railway uses, whether on rolling stock or in power house. And gallon for gallon—on the basis of actual service units contained—Galena Oils cost far less than any of the “lower priced” products, as may be seen from the mileage and cost records on any of the hundreds of electric properties under Galena lubrication.

Galena-Signal Oil Company
New York - Franklin, Pa. Chicago
and offices in principal cities

One-man cars in interurban service have a right to railway men's respect when they carry more passengers at half the expense of heavier equipment



G-E 264 Motor

K-35 Control

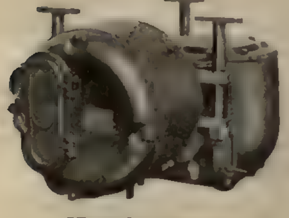
This Car Cuts Costs in Two

Five one-man cars like No. 301 are covering a 28.8 mile run through 22 zones on the Cincinnati, Milford and Blanchester Traction Company system. They weigh 15 tons, and carry 47 passengers, replacing two-men, 44 passenger cars weighing 30 tons.

These light cars with safety features have reduced power consumption 60 per cent and operating costs 40 per cent.

A part of their success must be credited to their equipment designed and built by the General Electric Company. These cars have G-E equipment throughout—G-E 264 Motors, K-35 Control, CP-27 Compressors, and J-12 Headlights operating from GECO Resistors.

"G-E throughout" is a sound policy for any railway. It unifies manufacturer's responsibility.



CP-27 Compressor

J-12 Headlight

GECO Resistor

General Electric
General Office
Schenectady, N.Y.
Company
Sales Offices in
all large cities

25-106

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HARRY L. BROWN Western Editor — C. W. SQUIER, Associate Editor — CARL W. STOCKS Associate Editor — G. J. MACMURRAY, News Editor
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PAUL WOOTON Washington Representative — ALEX McCALLUM London News Representative — ROBERT M. HAIG, Consulting Editor

Volume 59 — New York, Saturday, January 7, 1922 — *Number* 1

The Sales Idea Must Be Put to Work

ONE of the tangible results of the past year has been a definite entrance of the idea of salesmanship into the electric railway industry. He who rises to say that "merchandising transportation" has always been with the industry as a phrase should be told that that is only a part of the big idea which is really being turned into action in various places.

Salesmanship in the electric railway industry is something more than the mere selling of more rides. It is the largest factor in making a business out of the industry, or of putting more business into the industry.

This sales idea must be pushed and made more effective in 1922 than it has been so far. Surely those who have done something real in the way of putting more salesmanship into their business have reaped results to which they are glad to point for the benefit of doubting Thomases.

The trouble is usually that each man sees how salesmanship works some place else but doubts its efficiency on his property. The ELECTRIC RAILWAY JOURNAL hopes to continue its efforts to keep this idea, which seems valuable, before the industry by showing, during the coming months, actual examples of what real salesmanship is and means. It is the small, homely act which does the work, supported and inspired by a real selling instinct.

One fact should remain clear: Those who have done the most to promote the idea do not propose a separate sales force as an appendage to the organization, but that the whole organization be inspired with the sales instinct by having a salesman at the helm. Mr. Goodwin's citation, at Atlantic City, of Mr. Budd as the typical "sales manager" he had in mind is a concrete illustration of what is meant.

The sales idea must be put to work even more intensively. May 1922 see an accomplishment in this line which will show indisputable advantages resulting therefrom.

The "One Price, Single Coin" Idea Wrecks Another Industry

AND now the "Dollar Watch," of Ingersoll fame, has succumbed to the same sort of plague that smote the railways, with their "Flat 5-Cent Fare" slogan. The two cases are so much alike that we of the electric railway industry look with sympathy and understanding on the present troubles of the Ingersoll company. Here was a huge business, built more around the "dollar" than around the watch. It was undoubtedly the stress laid upon the fact that it was a *dollar* watch, a single coin (or bill to the effete Easterner) purchase which did most to build the huge successful business that the Ingersoll watch once enjoyed. It was the attempt, forced by economic conditions, to sell the watch at its worth with depreciated currency that wrecked the company.

It is not necessary to review to electric railway men the troubles into which the flat 5-cent fare—once the greatest talking point of the industry—brought the electric railways of this country. However, it is believed that it will be valuable for all railways to call public attention to the basic cause of the Ingersoll situation as an argument to show why railway fares should be such as to pay for the service rather than to be based or judged on the old flat 5-cent fare.

This should also be another impelling motive for railways to study their fare schemes to see if it is not advisable to get away from the "flat fare" as well as the "flat 5-cent fare." The industry is still experimenting on fares, as Mr. Storrs so ably pointed out in these columns just a year ago. The results of the experiments should be such as not to embarrass the industry in some future crisis by having a fare scheme, a price, which seems more important to the public than the service received.

The New Year Holds Promise for Further Sound Advancement

A YEAR ago, while other industry was in the throes of trouble from which it has only partially, if at all, extricated itself, we expressed a faith in the electric railway industry, in its ability to make 1921 a prosperous year. That, on the whole, it has done so to a degree unequaled by other industries is indicated in the rest of these pages. While other industries, even other utilities, have suffered depressions in 1921 heretofore unequaled, there has been a steady up-grade movement with the electric railway industry. The seeking out of weak spots has played as important a part as making strong spots grow.

And what of 1922? The whole world seeks as never before—at least since the cry of humanity for a leader nineteen hundred and twenty-two years ago—for leadership and sane thinking to make an end to destructive forces and to strife. Social and industrial welfare everywhere hangs in the balance with such momentous problems as the world's peace, discussed in the Disarmament Conference; as Irish peace, now seemingly assured, and as European economic adjustment. The effects of the results of such questions will be felt directly in industry as well as in social advance.

The electric railways cannot escape their relation to other industry if they would. They are, however, in a more advantageous position, a more secure position to meet the problems of the future. This future is, as always, in the hands of electric railway men themselves, and success or failure will be credited accordingly to them. But with a public greatly enlightened through the efforts of the past year, with a start made toward rehabilitation of properties weakened by the stress of war times, with a growing appreciation on the part of the investing public of the intrinsic value of investment in substantial securities of necessary industries, the problems of the coming year should be more closely identified with improvement in equipment and service, to get ahead of the times in an operating and a business way. As we said a year ago, the new year still contains problems and difficulties. "It is merely that they are different ones" in 1922 "from those that have gone before and been long since overcome or solved successfully."

And so 1922 is faced hopefully, more so even than 1921. It should be a year of secure advancement for the industry, a year for it to place itself even more firmly as an established necessary, useful and successful public industry.

Taxation Affecting Electric Railways—Outlook for Progress in 1922

THAT the present situation of the electric railways with reference to taxation is intolerable and cannot continue indefinitely without remedy is well known to the guild but is not known to outsiders generally. Radical changes are imperative, but the possibility of securing these changes practically coincides with the possibility of bringing to the public a real appreciation of the facts and their implications. There are some indications that progress is being made with this task of education and that 1922 may see some real accomplishments in the direction of more fair taxation of electric railways.

Congress, of course, can do little and will probably do less. The new revenue act of 1921, passed a few weeks ago, with its corporation income tax rate of 12½ per cent, increases rather than decreases the burdens of the industry. No one is satisfied with the new law and it is quite possible that there will be a revenue act of 1922. What its character will be the agricultural bloc will probably determine. But it seems scarcely reasonable to expect that reduced corporation taxes will form a part of the program.

It is entirely reasonable, however, to anticipate favorable action of Congress on the proposal to eliminate tax-exempt securities. The apathy which has been shown at the Capitol toward this measure should be dispelled and the issue forced to a decision. Its importance to the electric railway industry justifies exerting every effort in its support, as has frequently been pointed out in these columns.

Yet the least of the problem does not lie here. The taxes which really hurt, the ones which are forcing companies into bankruptcy, are those imposed by the states and localities. For the most part these taxes are a heritage of old franchise agreements and legislative compromises handed down from an age when conditions were essentially different from those which now obtain. Taxation in practice, and to a large extent in theory as well, has failed to keep pace with the changes in the economic and social conditions surrounding public utility operations. Variations in rates of fare have not been clearly articulated with changes in rates of taxation. Gross receipts have shown no close correlation with the Bradstreet's index number of wholesale prices, consequently taxes on street railways have come to bear no relationship either to ability-to-pay or ability-to-shift.

In various parts of the country the taxing authorities are beginning to take cognizance of the situation and the coming year should yield the first fruits of these new attempts to consider the problem. New York is one of the states which has been investigating its public utility taxes. Senator Davenport's joint legislative committee on taxation has made an exhaustive statistical inquiry during the past year and is expected to submit the results to the New York Legislature within a few days, together with its conclusions regarding the changes which should be made in the tax laws. This report is being awaited with great interest by the electric railway men of the state.

The time has come when it should be possible to secure agreement upon a set of principles governing the taxation of public utilities such as electric railways. Precisely what justification is there for the taxation of such companies under a system of controlled rates? What are the charges properly attributable to the companies for police protection and other municipal functions? How much of the "paving charges" are true costs and how much are taxes? Is there any excuse for taxes of this character? These are some of the questions which will be actively debated in the legislative hearings of 1922. The industry must co-operate in arriving at satisfactory answers—answers which will be fair and equitable from the point of view of all concerned. In this direction lies the prospect for real improvement in the tax situation of the electric railway industry.

Interurbans

Progress in 1921

ONE of the notable developments in the interurban field in 1921 was the advent of the light-weight one-man interurban car for use on the short lines where traffic and speed conditions do not necessitate heavy equipment nor the services of two trainmen. This type of car has proved highly satisfactory, and its substantially lower operating costs offer an opportunity in a number of instances to make operation pay where it is now unprofitable. Ways and means of financing such equipment to replace the old heavy two-man cars could, therefore, well be studied and vigorously pursued in 1922.

The automatic substation has played an increasingly important part in interurban operation during the past year, and its further application during 1922 is fully to be expected because of the very substantial savings it effects. A return on the investment of 50 per cent in one case comes to mind. An interesting possibility for 1922 in connection with power supply is the trial of mercury-arc rectifiers as a substitute for rotary converters. A foreign manufacturer who has built several installations for European electrifications that are reported to be successful is now offering to supply them here. Undoubtedly our own electrical manufacturers have been working along this line, and if the device comes out for trial in 1922 and is found practical, it will have a far-reaching influence on all future interurban, and also heavy traction, work.

From the standpoint of progress in engineering matters and standardizing of equipment design and maintenance practices, the formation of the engineering council of the C.E.R.A. is perhaps the outstanding development of the central territory, the great interurban region, during 1921. The coming year will witness some of the fruits of the labors of this body, and they promise to be good. There is ample opportunity for some real economies to be accomplished, not to mention the better operation that will result, if this council approaches the potential possibilities before it.

Perhaps the most serious development of 1921 has been the continuing growth of motor bus competition.

This is a difficult problem to handle, particularly where the state commission has not yet been given jurisdiction over bus transportation. In such cases the problem is largely one of salesmanship and adjusting the service to meet the new conditions. Probably the best course for the interurbans is to cater especially to the longer haul traffic by providing more and faster through trains. For the short hauls it is more difficult to compete with the bus, but for fast, comfortable, long-haul service the electric line has great advantages and should make the most of them. A number of new fast trains have been inaugurated during 1921 and practically without exception have met with very good success. No opportunity should be overlooked, however, in coping with this form of competition, to endeavor to work with the bus owners a plan whereby they will operate in conjunction with rather than in competition with the interurban. In many cases it is believed that such a plan of co-operation can be effected with resultant advantage to both railway and bus line.

The year 1922 brings new problems—let it also witness new methods of solution, more salesmanship and more "ginger."

Standardization Is Essential to Prosperity

THE standardization of a product ultimately benefits the user, the manufacturer and the producer of the raw materials that enter into it. The user is benefited by the interchangeability of parts, by the decreased stock necessary for maintenance and by the reduced cost of the product. The manufacturer's output can be increased with the same working force. Equipment and tools necessary for manufacturing can be decreased and a higher quality product with less rejections can be obtained. The producer of raw materials can develop a business of greater magnitude in a relatively few forms or compositions, whereas without standardization he would be called on to satisfy many varying demands.

With these recognized advantages why is there in some instances an antipathy to this work? Some old-time designers seem to feel that standardization hampers their expression of individuality and prevents progress. Some manufacturers have voiced the opinion that standardization removes a valuable basis of competition. These differences of opinion arise, no doubt, from a misconception of the economic field for standardization. Manifestly if we should attempt to standardize complete units as by covering in one specification the details of design for a complete car or truck of a given capacity we would be standardizing output rather than details and materials. The greatest benefit to electric railways will come from standardizing small detail parts, ruling dimensions, tests for materials and methods of manufacture. With such there will be no sacrifice of individuality and the designer can devote his attention to more important considerations.

At the present time the work of standardization is going forward all over the world with surprising intensity. During or since the war national engineering standardization bodies have been formed in ten foreign countries. Great Britain and Germany are taking the lead in developing standards on a broad scale. In England, the government has appropriated several million dollars toward the work, and in Germany there are 5,000 firms which are contributing members of the central organization. These two countries are America's chief industrial competitors, and the feeling is very general in each that standardization will be a most essential element in the development of foreign trade. It is interesting to note that Germany appears to be devoting her efforts toward standardization of manufacture rather than that of materials so that both labor and material will be saved by simplification of design.

In the United States the American Engineering Standards Committee was organized in 1918, but it has been in active operation only a year. At present there are nearly 150 engineering societies and trade organizations which are co-operating in the work. The American Electric Railway Association is a member of this group and is taking an active part in all standardization work of interest to the electric railway industry. Another advantage to the engineers and organizations engaged in this work is that thereby they are brought into close contact with the leading minds in all branches of engineering work. This increases and broadens the vision necessary for solving the problems in hand. For some time past there has been a pronounced feeling that our industries were functioning too much as independent units. The standardization movement is one of co-operation throughout each branch of industry, as well as between the different branches whose interests touch and overlap. It is not too much to say that standardization offers a major opportunity toward the integration of our industries on a national scale, so that they may function in a purely national way.

In the present period of readjustment a decrease in the cost of electric railway equipment is imperative. Such a reduction can come from more efficient methods of manufacture without lowering the quality of the raw materials. Standardization presents a means for obtaining greater production at less cost and for maintaining a high quality of equipment with fewer defects.

Rolling Stock Purchases Reach a New Low Level

THE annual compilation of statistics in this issue presents two noteworthy facts. First, rolling stock purchases during 1921 were the lowest recorded since these tables were begun in 1907, and, second, the mileage of track reconstructed is the greatest since record of this was started in 1917. The low ebb which equipment purchases reached has not failed to have its effect on the total rolling stock owned by the electric railway industry. The aggregate figure for 1921 shows that this new equipment lacks about 300 cars of replacing that retired during the past year. The track mileage reconstructed has no effect, of course, on the total mileage, but the new track built last year has been insufficient by approximately 150 miles to keep the total mileage from decreasing. The complete statistics of track in operation show that this total mileage is now 47,555.

Statistics are subject to a wide and varied interpretation. The causes of these changes are perhaps more easily traceable than the results. The predominating cause, of course, has been financial difficulty. Though the decrease in the number of cars and in the total mileage is quite insignificant when taken on a percentage basis, in stringent times it is but natural that money should be spent where it will net the highest return. Likewise, existing equipment has been worked to its utmost capacity. Therefore there is nothing alarming in these figures, which merely show that it has been necessary to abandon non-essentials.

The low record of car purchases is readily accounted for by the serious financial problem that the railway industry has had to solve. Price readjustment has been taking place, and no doubt railway officials are putting off the purchase of much needed rolling stock as long as possible. The only large order for cars in the United States was for the new municipal line in Detroit, Mich. Aside from this order of 225 safety cars and fifty of the Peter Witt type, there were but 1,188 other passenger cars ordered. These were divided among 984 for urban service, 129 for interurban service and seventy-five for rapid transit lines. When these 984 cars purchased during 1921 for urban service are compared with the 1,699 safety cars purchased during 1920 for service in the United States the result is somewhat startling. Safety car purchases decreased to 565. The ratio of safety cars to total passenger cars purchased for urban service has been decreasing slightly for the last three years, but safety cars still constitute more than half of this total.

Reconstruction of old cars has been quite active. An effort has also been made to find out the number of old cars reconstructed for one-man operation during the past year. The data obtained show 320 cars reconstructed with safety devices and 268 cars without safety devices. Several roads are operating cars with one man by simply closing the rear doors. Such cars are not included in the figures just quoted.

The amount of new track built during 1921 is about the same as for the preceding year. The city of Detroit with 46 miles of new track construction is the only place where lines were extended to any appreciable extent. The remainder is made up of turnouts, sidings and short connections. These figures indicate that extensions have practically stopped.

A total of 615 miles of track were reconstructed, as compared with an average of 320 miles per year for the preceding four years. This shows that the track forces of the various railways have not been idle. Electric railways also have not rebuilt track unless it has been found absolutely necessary. This increase in track reconstruction thus appears to be the result of deferred maintenance during the past three or four years.

United We'll Progress—
Divided We'll Never Get Anywhere

THE electrification of railroads is not making the progress that it should, due, among other things, to the unfortunate circumstance that the engineers seem not in all cases to be agreed on fundamental data. Conditions are better than they once were, but the lack of unanimity is bound to be confusing to railroad managers and boards of directors who are now or will soon be considering the advisability of using electric motive power. Some years back there was a merry war over the relative merits of two rival systems of electrification. This undoubtedly served to bring out a lot of information, but it could not but confuse the non-technical student of the subject. Apparently not all of the engineers themselves were entirely clear in the matter. Now, debate seems to center on such topics as the relative coal consumption, or its equivalent, in steam locomotives and in power plants furnishing power to electric locomotives, the relative costs of maintaining steam and electric locomotives, etc.

As a matter of fact these questions form the subject of quite a lively controversy in the columns of the *Railway Age* in recent issues. This was given its impetus by the report of the United States Geological Survey of the Department of the Interior on "A Superpower System for the Region Between Boston and Washington," which had much to say on the electrification of railroads in the New England district and southward. This report, it will be remembered, was prepared under the direction of W. S. Murray, and the section on electrification was the work of Dr. Cary T. Hutchinson and associates. Messrs. Murray and Hutchinson have devoted many years to the study of railroad electrification and have applied the results of their study on a considerable scale. What they know and feel about it should therefore have much weight with railroad men and others who are to have a hand in applying electric motive power to steam roads. The data and estimates which they have reported, however, have not proved entirely convincing to all railroad men, at least as far as the mental attitude of these men is reflected editorially in the *Railway Age*.

The position taken by the *Railway Age*, to quote from one of its editorials on the subject, seems to be this: "Unfortunately because of such statements [several being cited that were considered unwarranted by the editors] the data presented must be accepted with reservations . . . In using the report as a guide it would appear that it must be done with discretion." Messrs. Murray and Hutchinson reply that the *Railway Age* editors did not study the report carefully. This charge is promptly refuted, and so on. The *Railway Age* editors think the superpower experts assumed too much; in reply they are told that the "assumptions" are based on accepted data. Thus the fur flies.

In so far as this battle between the exponents of conservatism and enthusiasm with regard to railway electrification brings out facts, it is valuable, but it cannot compare in value with emphasis on agreed points. There is no doubt of the fact that the *Railway Age* appreciates the report on superpower as a whole, while Messrs. Murray and Hutchinson no doubt realize that the *Railway Age* believes in electrifying the railroads as extensively and as rapidly as economic conditions seem to it to warrant electrification. To be sure, the *Railway Age* editors think that Messrs. Murray and Hutchinson desire to go too fast. Per contra, these gentlemen apparently consider the *Railway Age* ultraconservative. It is a question of speed, not of principle.

In the controversy the ELECTRIC RAILWAY JOURNAL, standing on the side line, has no desire to interfere; the parties concerned are fully capable of handling their respective ends of the discussion. The JOURNAL does regret, however, that there does not exist that much desired and urgently needed American Committee on Electrification (under whatever name and auspices it may be called together) because such a committee could act as a clearing house for information of a character that would make a difference of opinion as to data impossible. The present controversy hinges on such items as coal consumption of steam locomotives and of power plants, maintenance costs of steam and electric locomotives, basis of comparison of steam and electric locomotive performance and such details. These are questions of fact, not opinion. Facts are usually determined by jury on the basis of evidence. What better jury could there be than an American Committee on Electrification? Once the facts are agreed upon, the course to be taken will be much clearer. Everybody wants to take the right course. Why not get together?

Fundamental Conditions in the Industry Are Better

ALTHOUGH the statistics of cars purchased during the past year are the lowest since this paper has compiled these statistics, or since 1908, the properties themselves at the beginning of 1922 are undoubtedly on a better financial basis than at any time for five years or more. Conditions may not be all that could be desired in the electric railway business, but they are returning to normalcy.

As in other lines of business, gross earnings have shown a tendency to decrease during the past year as compared with 1920, particularly since July 1, but it has been possible generally for companies to reduce their operating expenses so as not to increase their operating ratio. This is clearly shown by some figures for the first nine months of 1921, representing about 25 per cent of the total earnings of the industry and made public by the association last month. These returns show an increase in gross for the nine months compared with 1920 of about 2 per cent and a decrease during the third quarter of about 5 per cent. Nevertheless, in both periods, the operating ratio in 1921 was lower, *i.e.*, in the nine-month period the reduction compared with 1920 was from 76.6 per cent to 75.5 per cent and in the three-month period from 78.6 per cent to 75.1 per cent. Ability to reduce operating expenses proportionately with the falling off of gross receipts may not comprise the highest hope or ambition for the industry held by a stockholder. Nevertheless, it is a valuable quality, and when general business conditions change some of the economies effected will undoubtedly be retained. Incidentally, there are probably few large industries which can show during the first nine months of 1921 an increase in gross of about 2 per cent as compared with 1920 and an increase in net of about 9 per cent, yet these are the figures of the group mentioned.

The improvement thus shown is based on fundamentally better conditions in the industry, entirely apart from and in addition to the falling cost of labor and materials and even permission to charge higher fares. These additional bases for hope for future sound electric railway finances may be summarized as follows: (1) Recognition by the public that electric railway receipts shall be adequate to pay all costs of operation, including depreciation and a return on a fair valuation; (2) a growing acceptance of the principle that local transportation must be a monopoly and consequently that unregulated jitneys must be suppressed, and (3) the impossibility in two or three notable instances of finding any substitutes for electric cars as a means of mass transportation.

This does not mean that all of the financial troubles of the electric railways are past, or even that the critical condition of many are yet over. Special local conditions, such as inadequate fares, still hamper many companies and these must be remedied. In a great many other cases operating deficits of considerable proportions were accumulated during the war. Some time must elapse after net receipts have reached a reasonable amount to allow the companies to put the properties in good physical condition. With the reestablished credit which these net earnings will bring, however, it will be more easy for the companies to undertake the rehabilitation required. The track probably suffered more during the war period from lack of maintenance than any other part of the equipment, and as earnings increase it will be part of wisdom for the companies to rehabilitate their track promptly. In this they will undoubtedly bear in mind such changed conditions as have been caused on most properties by the addition of lighter rolling stock.

Another criterion of the financial conditions of any industry is the number of companies which have gone into receivership during the year. In the case of the electric railways this is slightly less than 1920 and much less than in 1919. This and the attendant circumstances, as explained in the text accompanying the table on receiverships, show a sounder condition of the industry than has existed for some time past, and while there have been many threatened abandonments and many short sections of track actually have been given up, there have been very few total abandonments of service by entire companies.

Statistical Service Extended to Automotive Equipment

ONE often hears the perpetual grouch bemoan the fact that electric railway operators, from president to master mechanic, don't have to ride in their own street cars, but are provided with automobiles by the company. This is a conception that gained wide currency during the years when automobile cushions grew softer and the wheels of electric railway cars lost their circular shape. The ELECTRIC RAILWAY JOURNAL now steps in with statistics, one of the customary editorial weapons, to show that propagators of such ideas are mistaken in their major premise. Our figures show that there are not sufficient passenger cars in the industry so that even one could be allotted to each property! To go further, the majority of these automobiles classed as passenger cars come under this designation only because the passenger body has not been replaced by a service body, although the car is really used in connection with line or track maintenance. Very few of the cars, of the limousine and coupé type which always appear promptly to convey the president to and from his office, could be found in the reports submitted by the various companies. A total of forty for this type appears almost insignificant in comparison with the size of the industry and, in fact, also with the actual inherent necessities of the industry.

As far as service cars are concerned, their number is roughly a thousand, or nearly twice the total of the passenger automobiles. The figure shows that automobile equipment for tower wagons, line and track maintenance and emergency uses has a very definite and valuable function as an auxiliary to other rail-borne service cars. The larger electric railways may have use for both kinds of service cars, but it is probably much better for the railways which have only a few miles of track to put whatever money they have to spend for such equipment into rebuilt rail-borne service cars.

The totals to this compilation are probably most interesting because of the difficulty in assigning so handy a vehicle as an automobile to any definite duty. A relative idea of the number of service automobiles compared with the number of cars operated by electric railways may be gained from the fact that there is one automobile for about every 110 cars. This ratio is nearly the same as that of rail-borne service cars to total rolling stock.

Association Activities Useless and Useful

THE statement "there are too many associations" is heard so often and rings so true that those in charge of the operation of associations have a duty to make sure of the usefulness of each and every activity. Americans are sometimes called a nation of "Joiners." It is comparatively easy to start an association along almost any line of human interest, activity or fad. All that is necessary is to have some central motive or thought, which may be religious, political, social, industrial, athletic, historical or gastronomic. An active campaign for membership will usually bring in recruits, and another organization is added to the vast number now in the country. Nevertheless, it would not be hard to find a consensus of opinion that there are several associations whose usefulness, if it ever existed, has disappeared or become negligible. As this is true of associations as entities it is also true of the individual activities of some of the associations whose general usefulness is unquestioned.

It is very easy to understand how such conditions arise—an association is formed and a headquarters established; certain activities spring up, committees are appointed, and away they go on programs which soon obtain such a momentum, or the individuals directing them are so wrapped up in them *per se*, that they go on long after their useful function has ceased. As in the case of one branch of the U. S. Army—so the other branches said at one time—it thought the Army was made for it rather than it made to serve the Army.

Associations—voluntary associations, at least—have a great responsibility in the expenditure of funds collected as voluntary dues. In this connection, they are not unlike municipal officials who spend not their own money but from a general public purse and are wont to spend of it more freely than they would their own. In associations of engineers and business men expenditures should be on a higher plane, however, as these associations are operated by men of business who have experience to draw upon and they owe it to their associations to do so.

American Electric Railway Association Performs a Useful Function

AS TO THE American Electric Railway Association, with its affiliated associations, the principal organization of interest to the electric railway field, it is gratifying to point out the useful work which it is doing for its members and the efficiency with which the present organization makes it possible to manage its activities. The headquarters office is on a real businesslike basis of operation. The executive committee in its monthly meetings has the opportunity of keeping in close touch with the current operations and, from the tenor of its discussions, is really doing so. This is making for even better and more useful association service and the executive committee will doubtless come more and more to see that the business principles the members apply to their own properties are applied to association affairs. This includes, of course, the point already mentioned of the most strict examination of every expenditure to determine whether it is fully justified by the benefits derived from it. As the annual budget of the association now is in the neighborhood of $250,000, the sums involved are considerable.

When one examines the services of the A.E.R.A. and the affiliated associations, it is very apparent that they are of value not only to the members but to the industry as a whole. That it is appreciated by the members is attested by the more than 10,000 requests for information received by the Bureau of Information and Service. Surely railway companies who are not now members of the association will do themselves, as well as the rest of the industry, a real service if they will study what the association is doing, and, seeing and believing, join.

Elsewhere in this issue, Mr. Palmer and Mr. Kimball show clearly the service which the Transportation & Traffic and the Engineering Associations are organized and prepared to do—are doing, in fact—for the industry. Mr. Todd has recently, in *Aera*, outlined plans for the American Association, and in his interview in the Dec. 10 issue of this paper told his own ideas and gave a picture of what his leadership will be. All these deserve study and prove the value of the association's work, which merits the support of every railway operating and manufacturing company. It is by organized effort only that certain things may be accomplished and advances made.

"Blocs" a Bane to the Railway Industry

AS IN governmental affairs so in the railway industry there has arisen a situation in many localities where "blocs," or groups of individuals, have been formed for the purpose of protecting their several group interests. Labor, the public, capital and the operating management have been forced to separate into such groups and to fight for their several interests through the use of voluntary or compulsory arbitration boards as controlling elements in industrial disputes.

The arbitration board is a method to compromise ethics and not morals, is correct in principle and is a potent industrial safeguard, but it does have disadvantages in that it results in the formation of antagonistic "blocs" both inside and outside the board. "Blocs" never look out for the good of the whole, and the progress of the industry will be measured by the degree of co-operation and not by the strength of the several "blocs." Furthermore, the arbitrary standards fixed by the arbitration boards in many industrial disputes have often been based on false premises and sometimes political expediency, so that today, when recision takes place in all railway expenditures, grave trouble arises because of the previous standards set up for compromising disputes.

Labor in particular formed a "bloc" which fought hard for deserved wage increases when prices advanced and now fights hard to maintain these same war standards. It is more able to fight because the machinery or "bloc" previously organized continues to function and, to make matters worse, in many cases irresponsible leaders have obtained control of the labor "blocs" and fight selfishly for their own interests.

The bright spot in the gloom arises from a consideration of recent decisions of the courts where the "cost of living" as the sole standard for setting the wage standard has been replaced by "financial condition of the company" and the "price of labor in the open market" as more pertinent standards.

If only the "blocs" can be unified and educated to realize that "all for one and one for all" is the true motto for arbitration and that the "all" means the co-ordinated railway industry, then the industrial methods of the past few years will result in progress.

This has happened in several cases recently in the electric railway industry, and the good results in these cases should serve as examples in other cases.

Railroad Electrification as a Power Plant Proposition

A LARGE part of the discussion regarding the electrification of steam railroads has centered in the motive power department. This is not because the freight and passenger transportation departments are not equally concerned with the matter, but it is because the crux of the whole thing is in the character of the motive power units. The question is, How and when shall electric drive be substituted for the direct mechanical drive now practically universal in railroad service? This question, as framed, implies that the ultimate electrification of railroads is a foregone conclusion unless some greatly superior form of motive power is invented and developed. This is the conclusion of large numbers of men who have studied transportation in a large way.

In order that this discussion may get anywhere with reasonable celerity, the subject must be approached from the standpoint of the railroads. To them the first question is: Will electrification aid us in giving the public the transportation which is demanded, and in giving this at such a profit as to enable us to command the money which we need in our business? If a convincing affirmative answer to this question can be given (and it can), then the next question is: What program will permit the introduction of electric motive power with the least disturbance to operation and financing? The answer to this second question will require the united efforts of the best minds in the business for some time to come. The first step is to become thoroughly familiar with the possibilities of electric motive power, viewed from the power-plant standpoint.

Fundamentally, the railroad has a choice as to prime movers between a large number of portable and traveling power plants, each relatively small in size, and a few stationary plants each large in size. These stationary plants could be owned and operated by the railroads, or the power could be purchased from power-producing companies. Who should produce the power is a matter of detail, not of general principle. Obviously the aim is to deliver it to the locomotives or motor cars with reliability and economy. The power plant is the railroad's prime mover, no matter who owns it or operates it. Everything else being equal, the large stationary power plant is superior. It is superior even to a multitude of small stationary plants, and much more so to automotive ones. What are some of its points of superiority?

First, the big plant does not need to be as large as the sum of the little plants. The "diversity factor" helps out, due to the fact that the power distribution system integrates the total load. In mountain electrifications some trains even become auxiliary power plants while descending grades. Again, the big stationary plant can be built to operate more economically due to its size; to the availability of condensing water for steam or of water power for use in turbines or impulse wheels; to the possibility of arranging the machinery for convenient inspection and maintenance; to the fact that it does not have to haul its fuel supply around, etc. These items of economy are important, particularly from the standpoint of fuel conservation. There is another advantage possessed by the big plant, however, which is of transcending import and which will have more influence on electrification than anything so far mentioned. That is the ability, through the medium of the electric locomotive, to deliver large, in fact almost unlimited, amounts of power at any points desired. This statement will stand some elaboration.

Ability to deliver concentrated power above that possible with automotive power plants means that tonnage trains up to the capacity of the draw bars can be hauled, or that speeds can be increased, or both. Thus track capacity is augmented, crew costs reduced, transportation service improved, etc. If these great results can be had at reasonable cost, then there is but one answer to the electrification question when track capacity has been reached under steam operating conditions.

One element in electrification has been assumed up to this point, namely, the electrical equipment of the locomotive and its electrical connection with the power plant. These are incidental, although obviously essential, to the discussion of the power phase of electrification. On the steam locomotive the engine is connected with the driving wheels by means of a simple and effective mechanism. On an electrified system the connection between the prime mover and the driving wheels is more remote and, of course, more complicated. Is this a serious objection beyond the fact that it is different? There is no valid reason why it should be so considered. The electric motor is as reliable as any steam engine; power transmission and distribution are already highly perfected; electric locomotives in use in fair numbers for many years have demonstrated their reliability. To be sure, the electric locomotive with its power connections is, or seems to be, in competition with a highly developed rival which has the advantage of being self-contained. The competition, however, is really not between two pieces of rolling stock, but rather between two power plants, one large and stationary, the other small and portable.

"Let George Do It" Is Out of Date

THIS paper has continually urged continuous publicity and advertising as a means of promoting good will and of increasing business. The electric railway is one of the greatest industries in the country and almost the poorest advertiser. Fifteen billion sales, yet millions of rides manufactured and not sold! Still some ask, "Why advertise?"

There is one feature about advertising, however, that is little appreciated by most railways, whether they advertise or not. This is that advertising is a profession today with its experts, its own science, its special knowledge, its statistics, etc. It is not something which can be turned over to "George" or any cub-reporter-type "publicity man." The American public, continually bombarded by advertising of all varieties and kinds, is acquiring taste in advertising as it is in its selection of almost any other product. It is a finicky public. The ordinary product is scoffed at. It knows good advertising when it sees it.

This leads to the obvious conclusion that a railway contemplating advertising—and all should do so as regularly as other businesses—will do well to seek professional advertising advice. "Let George do it" is out of date in handling advertising, just as it is in dealing with engineering, transportation and other railway activities.

Henry L. Doherty

President Henry L. Doherty & Company, the Cities Service Company

A successful public utility operator, a leader in business thought and practice, who has never lost the human touch and sympathy. In the accompanying interview he has talked intimately of the outlook both in general business and in the railway industry

Henry L. Doherty says:

Electric Railways Have a Secure Future

Present business conditions forecast good market for substantial securities—Readiness-to-serve and distance tariff charges still to be worked out—These and other problems still unsolved, and men of the industry must go to bottom of them—Transportation labor costs and conditions differ from those of other industries—Publicity must be in language of the man in the street—Immense army of employees should be utilized

An interview with Henry L. Doherty

By Harold V. Bozell

HENRY L. DOHERTY is variously known as a banker, a public utility operator, an exponent of the thrift idea and a leading oil and gas operator, but it is probable that comparatively few people realize him to be fundamentally an engineer in his natural tastes, and in his method of thinking. He is an engineer, too, who bases his engineering on thorough study and knowledge of scientific fundamentals, and he frequently delves night after night into various scientific works, into the basic chemistry and physics, to set himself right with reference to some technical problem in which he is interested.

Mr. Doherty has fortunately carried this habit or persistence of going to bedrock for a foundation for his judgment into the field of public utility operation, of general economics, of banking, and of any other subject with which he deals.

There are some who do not agree with Mr. Doherty's philosophy or with some of his arguments, but such people cannot gainsay his success in the various activities into which he has entered. His independence of thinking, his directness and virility of action are qualities which have placed him where he is today in the public utility, oil and banking fields. There are many who can remember his preachments of twenty and twenty-five years ago with reference to economics and practices of electric lighting and gas companies which are only now beginning to be generally adopted.

In the electric railway field the dramatic movement of the Toledo street cars into Michigan, the climax of his efforts to settle the Toledo strife of twenty-five years duration, is an incident still fresh in our minds. It will also be recalled that this incident was preceded in Toledo by a series of speeches and advertisements, personally directed by Mr. Doherty, which were notable in their broad view of public relations. The time Mr. Doherty spent on this particular situation was greatly out of proportion to its intrinsic value to him as a part of his entire business. This merely indicates his bent toward doing thoroughly anything he undertakes. If he only had more railway properties than he has, he might have taken other opportunities to bring forcibly to public attention some very fundamental railway facts.

It was Mr. Doherty whom I sought out for a discussion which might forecast to some extent the future of the electric railway industry. It was characteristic of him that he immediately started in to talk about that factor which is fundamental to the success of any business, namely, general business conditions.

"I have no hesitation in saying that most people attach entirely too much importance to the depression in foreign trade," he began. "Why does absence of foreign trade hurt us when we have so much yet to do in this country? I think we are sound, and that if we will quit worrying about foreign trade and get to work and do the things which we want to do and ought to do for ourselves we will soon be quieted down and working along normally again. The worst feature of our lack of foreign trade is that, like a scarecrow, it overawes us.

"Take petroleum, for instance. The United States and Mexico produced less than 190,000,000 barrels in 1910 and more than 600,000,000 in 1920. Our foreign trade has never amounted to much more than 15 per cent by volume. In a business growing so fast as to treble itself in ten years it requires but a short time for the growth of business to compensate entirely for a complete absence of foreign trade.

"We must adjust ourselves to foreign trade conditions and not continue to produce some things in excess of the world's market, and turn our available activities into the channels of production which we need and can use. Our building program is at least five years behind and that alone offers opportunity for labor and capital largely to take up our slack. To be sure, in manufactured goods we have produced in many lines too great reserves, but that does not mean we have to export those in order to keep making some more like them, but that we should turn our energies toward the building up of some of those things in which we have fallen behind."

"Where do you think we are on the business cycle—employment and unemployment, security values, general business conditions and production?"

"It looks to me as if March would probably be the low point in unemployment on account of the winter weather closing down some activities and the fact that spring has not yet opened them up. However, I believe that security values should improve. We have had a period of high interest rates, and while the world has never had any such condition as it is now experiencing, it has gone through some great economic disturbances, and it is always apparent that after a period of high interest rates we have a period not only of rates lower than the high ones, or normal rates, but actually of subnormal interest rates.

"During the boom period of the late eighties and early nineties interest rates went to abnormally high levels but after our financial and business collapse of '93 interest rates soon commenced to fall, going to subnormal levels and remaining there for several years. The Bank of England's discount rate went down to 2 per cent and remained there for more than two and one-half years, and during that period it was not unusual for commercial paper to be discounted at the rate of 1 per cent per annum or even less. Low interest rates mean inevitably higher market values for investment securities. In my opinion we are bound to have much lower interest rates and unless we have a quick and widespread revival in trade they are bound to drop to subnormal levels."

"For what reasons other than it has happened before are we expecting such low interest rates again?" I asked. "In other words, as you see it, what are the present factors which point so definitely to lower interest rates, and higher security values?"

A Coming Demand for Substantial Securities

"Following such a collapse of business as we have had in this country recently, there is naturally idle capital. During prosperity the investor gets restless. He has always been used to, and satisfied with, rather safe, low-interest-bearing securities. But in boom times he strays into the speculative field. Then, just as soon as he realizes that the element of speculation has gone against him, he immediately hunts security; it is then a question of 'safety first' for him. As a result, there is a demand for safe investment and a search on the part of the investor for substantial securities. This, of course, in the end makes for substantial productive business conditions in the country.

"Another element will be our getting away from the thought that we are wholly dependent on export business for a return to normal business activities. There can be no such thing as a permanent balance of trade against any country. When we in this country were laying the foundation of our present great wealth, our exports were low. During the period when practically all of our railroads were being built we sold low interest bearing bonds abroad that did not show in our balance of trade and yet that was about the best export business that this country ever did. It was that period of internal improvement that contributed most to our present wealth.

"Now we are a wealthy nation—perhaps too wealthy for our own good—and we need improvements badly, new buildings, new extensions of utilities, new extensions of reproductive industry for our own population, and it seems worth while to use our wealth in that way.

"There is another angle to this, and that is that I believe we will have an immigration of the right kind. Conditions abroad are such that the man who has training such as the trained mechanic, the trained farmer, the trained scientific man, etc., will naturally emigrate to this country rather than continue to live under the intolerable conditions of Europe—intolerable compared to those which he experienced while he was obtaining a certain status in his home country. This ought materially to aid the proper building up of American industry—certainly it is more useful than an immigration of the cheaper, uneducated, untrained, foreign common laborers, who come and work for a time and the more thrifty and therefore more desirable class return to their own countries.

"It looks to me as if the United States will be the great tourist country of the world, and that we can set the pace for the world if we are wise. You can put a tack in this statement. More people of the foreign countries want to see America than ever before and many of them will find ways of doing it. They will talk about what is going on in New York as we used to talk about what was going on in London and Paris."

In connection with a survey of the general business conditions, and the supply of money in reproductive securities, I was anxious to know what Mr. Doherty thought of the effect of the present tax law. The tax-exempt security seems to be the monkey wrench in the machinery—at least so far as the supply of money for some uses is concerned—and he gave very definite views on this subject.

Reproductive Industry Hampered by the Tax-Exempt Security

"The excessive income tax coupled with the tax-exempt security has done much to bring about the present business depression. Being an engineer, and not a lawyer, I don't see how any sane man can read the Sixteenth Amendment to the Constitution and say that there are any tax-exempt securities. If you wanted to word a statement to indicate that there were to be no tax-exempt securities I don't see how you could find any clearer language than that which is used there, namely, that Congress will have the power to levy a tax upon income 'from whatever sources derived.' The language of the amendment provides strictly for a tax against income and is not a tax against the bond which is held. It will be a great step forward for the country if the tax-exempt securities not only in the future, but also those now issued, may have their tax-exempt features eliminated.

"The effect, of course, is that capital is encouraged into non-reproductive investments. What I mean by reproductive industry is that when capital goes into that sort of enterprise, the things which are built are factories, and tools, and everything which gives opportunity to men to produce something more and earn their own living thereby as differentiated from buildings and statues, and many other classes of public expenditures which do not form the basis or give the opportunity for use by the people for further production."

It was about here that Jack, the parrot, commenced to give trouble. For we were having this interesting discussion at Mr. Doherty's house, which is near the Wall Street district of New York, and one of his house pets is a green parrot, which says all kinds of timely things, and which just now started to attack one of the palms. However, no amount of persuasion from Mr. Doherty would coax Jack onto his hand, and it was necessary to call the cook, who seems to have a greater control over the recalcitrant parrot, and who was finally able to induce him to stop his destruction of the palm and go to the kitchen for something to eat.

This residence of Mr. Doherty, by the way, is something unique. Several years ago Mr. Doherty tired of his daily ride on the New York subway, or on New York's crowded thoroughfares, and decided to forsake his Riverside Drive apartment and locate within walking distance of his Wall Street office. He consequently purchased an old tenement building just south of the famous Curb Market on Broad Street and refitted the second floor for his bachelor apartment. This combination of home and office proved so satisfactory that he has recently finished a permanent residence on the top—the eleventh—floor of the Battery Park Building, opposite Battery Park, at the lower tip of Manhattan Island, and overlooking New York Harbor. Here he has a gymnasium, squash court, billiard room, sleeping porch, bowling alley, and a comfortable residence with those other things which tend to make one healthy and happy, and it is here that he is more often found than at his so-called business office on Wall Street. While able to keep in constant telephone communication from any part of his house to his office, it is at the house that he has his books and surroundings which make it easier for him to work uninterruptedly on his problems. It was across a small table in the combination gymnasium-sun parlor that we were talking, and it was here that Jack was getting intimate with the palms.

"THERE never has been anything to take the place of the public utility. In other industries something else comes along, and substitutes for, or actually supersedes, the industry or the product, and we see a decay of the former industry. But this is not so with the public utility, which is supplying a service of public necessity — certainly of public usefulness — and while improvements may be made in means and methods, the service required does not change."

PUBLIC UTILITY ALWAYS INHERENTLY SOUND

After Jack was quieted, our conversation turned toward public utilities and railways. "There never has been anything inherently wrong with public utilities," said Mr. Doherty. "There never has been anything to take the place of the public utility. In other industries something else comes along, and substitutes for, or actually supersedes, the industry or the product, and we see a decay of the former industry. But this is not so with the public utility, which is supplying a service of public necessity—certainly of public usefulness—and while improvements may be made in means and methods, the service required does not change.

"Our troubles come from lack of conception of the actual situation. Originally, we were regulated on account of the understanding that the public utility is a monopoly, but then the public forgot this recognition of the public utility as a monopoly—at least it forgot to insure to the public utility the right of being a monopoly at the same time it subjected it to the regulation of a monopoly—and, in the case of the electric railway, for example, has subjected it to competition of the jitney. There is, of course, a gradually growing appreciation of the jitney situation, but there is much that the railways can do to impress this upon the public. It is idle to believe that a rubber tired vehicle using gasoline as fuel and an independent power plant in each vehicle can successfully compete with the electric railway.

"I like always to come back to the 'readiness-to-serve' charge, as a basis of impressing some of the fundamental facts of this subject. A readiness-to-serve charge in any public utility is always there whether it is seen and applied or not, and the burden of this readiness-to-serve charge falls upon the regulated utility expected to furnish regular service. In electric railways, as all electric railway men know, cars have to be run whether there are passengers on them or not. In some figuring which I once did on this subject, in trying to find out what the cost of service was with the passenger and without the passenger, I found that our readiness-to-serve charge or cost was from 80 to 85 per cent of our total operating cost, only 20 to 15 per cent of the operating expenses being applied to the actual carrying of passengers. If the jitney was forced to give service to all parts of the city and at all hours and not simply carry passengers when the going is good, the cost would be double or three times as much as for the street railway performing the same service. This is a point which I believe electric railways can stress much more than they have done up to the present. They should indicate to the public the responsibility for being ready to supply service upon demand, which is borne by electric railway companies — by any regulated utility—and that it is something for which the utility must be paid if it is going to continue to bear it. The jitney, on the other hand, does not have any such requirements, and since so large a proportion of the jitney revenue can be expended directly in the cost of carrying passengers, and need not be spent in providing a readiness-to-serve service, most comparisons between the jitney and street car must be taken with plenty of salt.

"There has been something done on this question, but much of what has been done has not been done intelligently. By this I mean that statements of the facts which I have just made have not been put in proper language for the general public in a sufficient number of places for this to have seeped into the public mentality in the way for the public to understand what is to its own best interests. It will be a very useful thing indeed to reiterate such things as this in the language of the man on the street, and reiterate it so often that he will be bound finally to understand what we are driving at.

THE FOLLY OF THE FLAT FARE

"There is another mistake which I think railway men have made since the early days of the electric railway industry, and that is the attempt to carry a man any distance for a flat fare. I think the same mistake was made in the electric lighting industry, but that industry soon broke away from the practice, whereas the electric railway is still hampered by the custom—and as a matter of fact, the community itself is hampered in its best development by such a plan. The idea seems to be that the public should get what it wants and the public thinks it wants a flat fare for a given community, but here again is an opportunity for education in the interests of the community.

"I think it is the best thing for the community as a whole to have a distance tariff scheme. We don't have enough railway properties ourselves to make it worth our while to develop such a system, but I think the railway industry is bound to come to it in some form or other in the future. But in addition to this being a subject upon which the public should be educated, it is also one for the men of the industry to study and decide themselves. There are troubles inside the industry such as this and the reason for some of them is that a good many of the electric railway men have never gone to the bottom of things to find the right economic and business solution. It is only now, after twenty or twenty-five years of experience, that gas companies have found that they must come to 'a readiness-to-serve charge,' for example.

"How can this be applied on railways? That is a natural question and I don't know the answer that will work out best. Perhaps in some way it should be levied on the riders or on the city as a whole. It might be a tax on property on account of the more or less equalized value of the readiness to serve to the whole community, for certainly the community as a whole is benefited. It is difficult to tell where to lay the readiness-to-serve charge and how to apportion it, but in some way it should be worked out and this might prove the easiest solution of our street railway problem. Let's assume that you as an individual have your residence 3 or 4 miles from the center of the city. Even if you depend upon an automobile for your own use you are still dependent upon the street railway to maintain your residence. Your help must come and go on the street railway. Many of your supplies reach you that way. What do you think you could afford to pay in the way of an annual charge rather than to have the street railway abandoned?"

"Do you see any likelihood of its early solution?"

"I don't know—I sometimes get discouraged trying to get decisions or common action by business men. A good many of our troubles I think we can trace to ourselves as business men. As individuals we all have our own fad notions and it is a mighty difficult thing to get business men to agree on any one thing and go down the line together in common action. We need more real thinking business leaders in our business life.

BUSINESS LEADERS LACK TEAM WORK

"I don't know whether I ought to say it or not, but it seems to me that a good many business men are 'accidents.' In other words, a good many men at the head of large business interests are there not because they created them themselves, but because by some accident or other they came to be the heads of businesses created by others. This is nothing particularly against the men who are at the heads of those businesses because they are probably the best men in the organizations to come to the head, but they are not the creators, the original thinkers which it would be best for the country to have at the helm. This is one reason, I think, for it being difficult to get business men in many cases to agree upon certain fundamentals of common action.

"The electric railway industry is no particular exception and here, too, we find it difficult to get agreement and common action on some of the important and really fundamental problems of the industry."

"Well, Mr. Doherty, what do you really think of the future of the electric railway industry? How about buses? How about the security of investment and opportunities for future expansion, etc.?"

"I have always been considered a pessimist on street railways, but now I probably would be considered an optimist, though as a matter of fact, as I see it, my view has not changed a bit. I am very hopeful. I look to the future of every electric railway in a big city as being a successful electric railway—a successful business with every reason for feeling secure in its position as a permanent, legitimate enterprise. Costs are coming down, which will help the railways some, and there is really a better understanding of the railway problem.

LABOR CONDITIONS AND COSTS

"There are also very much better labor conditions in the electric railway industry than before. But this does not help the cost of producing transportation very much, for no matter how the labor conditions are improved, costs are not improved as they are in many other lines. This is somewhat different from the situation in most other industries, for every time that labor conditions improve in any manufacturing industry it means that the cost of production goes down in much greater ratio than the reduction of wages. Production per man increases. In the case of electric railways, on the contrary, better labor conditions mean better operating conditions, probably more revenue on account of better public relations, and things of that sort, but the costs are not reduced, for better labor conditions are not accompanied by greater production, as we have the same number of men per car whether they are surly and dissatisfied or pleasant and satisfied.

"I am in favor of as high wages as it is possible for the railways to pay, as I think it tends toward good labor conditions, satisfactory and secure relations with the community. As to what I think of labor unions, I think principally that the abuse of power which we have seen in several instances has been principally an abuse of power by the men who became leaders rather than any desire on the part of the men themselves.

"I may repeat, but I cannot emphasize too often, that I think the whole problem of electric railways is a matter of education of the public. Through such education, or on account of such education, we can sell our securities. But we cannot be subjected to unfair competition. If the competitor, the jitney, is to be allowed to run only when and where it pleases then the restrictions requiring readiness-to-serve service of the railway should be removed and it should be allowed to run only when men want to come in crowds, and when they want to come singly they would find no cars to carry them. Possibly a little education of this sort might be good in more places than it has already been tried.

"I think our electric railway problems of the future can be summed up in two words: Fares and jitneys. I think the proper fare is a matter of education and I don't think it matters much how high the fare is—that is, on what level of fares we operate. I do want continually to hold in mind, however, that I favor a distance tariff with as low a basic fare as possible."

"Don't you think there is any upper limit in the fare? Can we keep on going up and still give the service to the community in providing a means which people can afford for transportation?"

"I think it's a question of analyzing each city. Take New York, for example. I have not studied the situation and have no fare scheme to recommend for New York City, but assume that the fare were 15 cents from 100th Street to Wall Street on the subway, do you think there would be any riding loss. Every one would have to come to work and after getting used to the new charge would probably make no more fuss about it than they do about increased prices of everything else. Why should any one be shocked at slight increases in fares when other things went up the way they did?

"What we need is to put this matter in such a clear way that people can comprehend. And in discussing this question of how to word publicity matter and how to reach the people, I was impressed from the results of our war intelligence tests in learning about how much of our population is really just above the feeble-minded state. This means that we must use language and examples that people are used to. We must talk the people's language—the language of the people who are going to read what we write. I have seen publicity matter —advertisements and car cards, etc.—which couldn't convince me—or any of my associates who happened to be along with me—and how under the sun stuff like that is going to convince those who know absolutely nothing about the business I can't see.

> "THERE is a clamor for the public to have a share in the profits of railways, but I think we must realize and the public be made to realize that service at a low price is a dividend to the public. It is a dividend of real and tangible value and the public will some day realize this if it does not now."

"We must show the folly of duplication of service—must show how much duplication of service there was before regulation set in and how, in the interest of the community, it must not now be allowed to grow up again and hamper development of the best transportation service."

ADVERTISING AND PUBLICITY DEPEND ON THE "COPY"

"What do you think of advertising by railways?"

"I have had a lot of people write me and ask me whether or not they should put on publicity campaigns. In answer to every question of that sort I reply 'show me the copy and I'll answer.' I think it is absolutely always a question of what the advertisement says. In some of them there is more bad than good accomplished. In some cases any old ad smith is given the job of writing advertisements without a real understanding of the problem. Consequently it is not well done—it frequently looks extravagant and more often than not the writer is too far away from the reader. This does not mean to detract from the excellent work which has been done in this line, but if what I can say will assist in building up constructive information to the public, I shall be glad.

"But an advertisement is not so effective as the creation of centers of information and of centers of spreading this information by word of mouth and by general education of newspaper editorial writers, etc. I remember not long ago a question of pressing and great interest to the oil industry. Some of us wrote a real long article—twenty pages or so—which was conclusive, clear and understandable and was sent to newspaper editors marked 'not for publication but for editorial consideration.' This did the job. Newspaper editors were glad to get authoritative information and were convinced that they should stand for the proposition as a matter of principle in the best interests of the community.

"I think ultimately we will have the public gain a full realization of the folly of anything but a perpetual—that is, indefinite—franchise. It is impossible to give an artificial death date to any legitimate business enterprise, and to try to do so merely limits the possible service to the public. This all electric railway men know, but it must be put in a language either of our own or of others who realize it, which the public will and can understand."

"Speaking of franchises, do you see in the service-at-cost franchise a permanent solution of the problem?"

"Service at cost is merely one way of reaching an agreement with the public. There are naturally all sorts of contracts, some with better features than others, and it is sometimes most expedient in a given community to adopt the service at cost principle and in other communities some other principle of agreement between the railways and the public. The service at cost is not yet perfect in that there must be some division of profit or some other reward for meritorious operation. In other words, while service at cost has many advantages I think that it is still subject to improvement in the interests of the best public service."

It seemed worth while to have Mr. Doherty's thinking with reference to the distance tariff scheme of charging, for his ideas and work in connection with rates for gas and electric service are well known to those who have associated with him in those fields.

"As I said before, I haven't any scheme worked out but I have thought of some principles which in some way or other it seems to me ought to be applied. Parts of them have been applied some places in the world but never, at least in this country, to any degree of satisfaction. How about having an odometer on the car, for example, and as each passenger gets aboard have him have his ticket stamped with the mileage at which he boarded the car and have him pay as he left in proportion to the mileage which he had traveled as shown by some large odometer at the dismounting end of the car? I don't want anybody to understand that I am suggesting exactly this thing as a means of doing it, but it is a principle which I think will some day be worked out in the electric railway industry. There will probably be some initial charge plus a distance tariff and there is bound to be some similar collection scheme which will put the principle into operation.

"It seems to me—in fact, I thought of trying it one time—that you might sell transportation by the yard, like a roll of tape, and no one would have to deposit cash but would make his purchases monthly or whenever he ran out of transportation tape. For each ride he would deliver a length of tape proportionate to the length of his ride. Occasional passengers would pay a high cash fare. This is another idea, impracticable as here stated, but which may be and probably will some day be the basis of charge. It is in a way similar to the mileage book on the trunk-line roads.

THE DISTANCE FARE IS AN AID TO SOCIETY

"My fundamental principle is that there should be some distance system of charging for riding. Most people do not know what the effect is. People in the United States herd together now, and it seems to me that the distance tariff scheme would tend to make people separate—it would tend to do away with this herding together of people of like nationalities and tastes—principally immigrants—in other words, it would help the melting pot which we call America.

"Some people say it would tend toward congestion, but it is my belief that it would do exactly the opposite. It has been found in foreign cities that the distance tariff scheme tends to make the average ride shorter. Each man in place of riding several miles, rides only a short distance and this requires less equipment. I think this is the reason for showing less investment or fixed charges on some of the foreign transportation systems and I think it is not well understood in this country.

"This question of fare adjustment is especially important just now, for prices are being adjusted in every industry and the present offers the best chance the railways have ever had to get away from the flat fare and start a real measured service method of charging. It will be done some day, and every day it is put off is a day lost. It will need study to find the best way, but it should be done. The principle is right."

Taking up some of the other problems of the railways, Mr. Doherty expressed his strong approval of customer ownership of securities and urged more of it.

"We must make and emphasize the statement that there is no real competitor of the electric railway. It provides the service which no other agency has been able to provide in any acceptable manner. We must educate the public to an understanding that as car riders they should not pay for paving between the tracks and for cleaning streets. We can also do a great deal to eliminate the use of the private automobile for the individual man's travel to and from his office.

"There is another thing in the railway business which is little appreciated and that is that there is such a thing known as load factor. I think a great deal can be done toward increasing the load factor—smoothing out the load curve—of the electric railways and I think we have not even made a beginning toward staggering of hours in the general interests of the community's transportation requirements.

"There is a clamor for the public to have a share in the profits of railways, but I think we must realize and the public be made to realize that service at a low price is a dividend to the public. It is a dividend of real and tangible value and the public will some day realize this if it does not now. As to what is a low price—I think any price which has so far been named as a price is low. If the leaders of the industry will realize this situation and if they will impress this conception upon the public I certainly have no fear for any money which is invested in the industry.

RAILWAY EMPLOYEES MUST BE MADE MORE ACTIVE

"But again it is a question of education. We have over a hundred million people and a large part of these are users of the electric railways. They can't think right if we don't think right ourselves. There is the vast body of employees who ought to be working continually to spread this information, but how much use of these employees has been made—how much has been accomplished or done through them? I know that employees get awfully tired of listening to their own executives and superintendents talking to them about the problem. There is no reason why I, if I had more railway properties and had the time to do it, shouldn't start out and call meetings in various places and talk about the problem. The officers of individual railways cannot keep doing it to their men, but outsiders should be brought in. I think this is something which should be encouraged more and more in the industry—many more talks by the right kind of men in the right kind of language, operating through the employees to the public.

"There are few companies which have done anything and there are very few which have done much. One of the reasons is that the executives themselves have not been educated to the desirability—the necessity—of doing this and then there is the problem of educating the employee after the executive is sold on the proposition."

When he was told of the activities of the association in response to the suggestion of Mr. Wickwire that the employees of companies manufacturing supplies for electric railways be used in this general education campaign, Mr. Doherty voiced his hearty approval of the plan and said it was right in line with the things he was thinking about as being useful and necessary.

And as to the bus— "We've had enough of the jitney in Toledo and I think it is true that there isn't any place for the jitney in the city transportation field. However, in non-railway territory, I think that the bus has a place and that it should be used by the railways in connection with their transportation system. I don't know much about it, but as a business proposition it seems to me that it is only natural to use the bus in light traffic supplemental territory."

But again Mr. Doherty came back to the question of the use of the employee in public education.

"Collectively, the industry ought to make up a program for employee activity with the public. This should be carefully worked over and put into operation for every electric railway in the country. It is one of the greatest latent forces which the industry has at its command to stabilize itself quickly and on the right basis with the public.

"As I said before, I am an optimist on the future of the railway and in discussing the problems before us I have merely tried to forecast, as you have requested, some of the developments which I think will take place in the industry for its good and for the good of the communities in which the various railways operate.

THE POWER OF THE BUSINESS PRESS

"And by the way, you in the trade or business press should be doing more than you are doing to help in this general situation, not only of railways but of all industries. The business press is a powerful agency, and particularly the technical press is a factor and can become a much greater factor in the solution of the business and industrial problems of the country. I think you have the same difficulties in the various units of the technical press that I have related as existing among business men in general—namely, the difficulty of operating together on a problem upon which you are all agreed or can easily agree.

"But I do want to emphasize that the technical press at the present time reaches practically all of the key men of the United States—by key men I mean any man who bosses a group of other men, whether they are five or ten or 1,000 men. If he is in that position he has a higher grade of intelligence than the rest of them and has an influence on their thinking, and if leaders of men from bosses of five to the most influential executives in the country can be reached through the business and technical press you have a power and an opportunity to accomplish things for the good of general industry, and therefore for the nation itself, which is immeasurable.

"I am appreciative of the opportunity of talking through the technical press on railway problems, even though my own activities are not very much in the railway line, for I think it is one of the vital industries of the country and that upon its success and continuous service to the various communities depends in a large measure the business success of those communities as well as the satisfactory development of community social activities and of housing and living conditions."

T. & T. Problems to Be Solved

Six Committees Actively Engaged in Studying Live Transportation Topics—Present Time Most Propitious for Betterment of Service and Merchandising This Transportation —Ways Pointed Out by Which This Can Be Done

BY L. H. PALMER
President American Electric Railway Transportation & Traffic Association

A MOST essential characteristic of the mental equipment of a successful man in any line of endeavor is the ability to visualize all sides of a subject, to be able, as it were, to look around, above and below the problem under consideration. That ability, I believe, is particularly essential in the handling of public problems, those that affect the comfort, prosperity and well-being of the citizens of a section or a community. If this premise is correct it applies with especial force to that large body of the public utility fraternity engaged in the operation of electric railways. At the request of the editors of the ELECTRIC RAILWAY JOURNAL I will outline some of the plans which the American Electric Railway Transportation & Traffic Association has for carrying out this work during the coming year.

MERCHANDISING TRANSPORTATION REPORT WILL BE AN OUTSTANDING ONE

Many of us, too many, I believe, are not taking up, in a whole-hearted way, the great problem of making our services conform to the desires as well as the actual needs of our patrons. The merchandising of transportation committee of the American Electric Railway Transportation & Traffic Association is entering on the third year of its work. Many excellent suggestions have been made and many data have been prepared for use by our member companies in the two reports already issued. Further ideas on the subject have come out in the discussions at conventions, in meetings and in the technical press. Now, I ask, are we getting the full benefits available from this work? No. Hence my reiteration of the statement with the hope of emphasizing its great importance.

The trouble with many of us in approaching this all-important matter of merchandising transportation is the lack of mental flexibility. A combination of the well-known "Let George do it" attitude mixed with a generous portion of "stand-patism" (when this insidious combination is compounded and a dose taken) does not get merchandising transportation any further on a property than the famous celluloid canine got in pursuit of the asbestos cat in Hades. The committee on this subject for the present association year has sufficient vital work laid out for its accomplishment so that next October, as at the last convention, its report will be one of the outstanding ones.

Meanwhile, during the year the Bureau of Information and Service at association headquarters will keep the subject before our membership by bulletins, articles and compilations. Moreover, this bureau will be glad to be of service in a specific way to any company which is developing this method on its property.

The more a person studies this subject, the more he will find that it enters (or should enter) into the consideration of all the important problems that he must study and solve; hence the necessity for the ability to comprehend all phases of the subject. Somewhere in every electric railway problem will be found a side affecting the public and the merchandising of our product to the public; hence the need, in electric railway men, for that foresight and judgment which recognizes adequately the public side of our business and keeps that side to the front, so that it will receive full weight in arriving at decisions. If I have made myself clear, it will be understood why this subject, in my judgment, has been given first place in the work of the Transportation & Traffic Association this year. I should like to make it so plain that on every property some active attention would be given to the question.

SAFETY WORK CREATES PUBLIC CONFIDENCE

Public confidence is the greatest asset any railway can possess. It cannot be measured or expressed in figures, like the outstanding securities of a corporation, but it influences very largely their actual as well as their quoted values. It is one of those powerful though silent factors that measure the real success of a company and its executives. Merchandising, honest and frank publicity, courtesy and fair dealing, both with the public and with employees, and constant watchfulness to meet the needs and reasonable desires of the car rider must be practiced to obtain public confidence.

One of the important means by which public confidence can be gained and thereby the position of the corporation strengthened in the community is the intelligent use of safety methods. Moreover, when the safety movement is intelligently conducted, it will more than pay for itself in a reduction in accidents and damages, thus not only reducing expenses but, what is infinitely more important, conserving life and property.

Safety instructions to employees go hand and glove with merchandising instructions, and these two topics form a fine team for gaining public co-operation, which is a step toward public confidence. Moreover, as other men have emphasized time and again, and as was explained in the last report of the safety committee, safety work establishes a basis of confidence and respect between employer and employee which is of great value in the upbuilding and retaining of proper co-operative relations between the officers of the company and the men whose activities they direct. We all know the injurious effects on the service rendered of a high turnover of employees, and largely to the extent that the turnover is reduced do we improve the quality of our product and increase the number of satisfied patrons of the road.

Even a casual study of the report of last year's safety committee will indicate the great possibility for further application of this movement to the activities of the average street railway company. Just as was emphasized at the last convention, the responsible executive in charge of operations must not only be a sales manager, but he must be an apostle of safety. It is the same old story that has been so often pictured by word and by cartoon, that what the president or general manager thinks guides the attitude and actions of the men on the cars, who are our direct representatives with the public. It is this underlying principle that I would like to re-emphasize, because of its vital importance in the effective management of our properties.

Both merchandising and safety, to be effective, must be impressed into the conscious actions of the platform employees and the supervisory force of the transportation department—that is, the personnel in direct charge of handling the public. Personnel is a comparatively new word in our vocabulary, but it has had great vogue since the beginning of the war. To my mind it means more than merely wage earners or employees, and somehow conveys the thought of an intelligent group of men, all of whom are working toward the common good of their organization.

TIME NOT WASTED IN BUILDING ESPRIT DE CORPS

I am a great believer in frank dealing with the employees of the company and feel that the more intelligent the understanding of our problems and situation is on the part of employees, the more effectively can we explain our difficulties to and obtain the co-operation of our patrons. Yearly we are coming to realize more than ever the possibilities of using our men, who come in direct contact with the public, as a means of reaching the public. The motormen and conductors are our actual salesmen, and largely in their hands, through their courteous and intelligent treatment of their patrons, rests the final impression that the public has of the street railway company. This conclusion cannot be denied, and therefore, it seems to me, that the utmost efforts are justifiable in making these men salesmen of good will and confidence.

I feel that it is hardly possible for a far-sighted executive or operator to spend too much time in building up the esprit de corps and the intelligent understanding of the company's problems and position among all employees. When such work is carried on and proper contact is not only established but maintained with the employees, the misunderstandings between the management and its men will be eliminated. I am satisfied that this is not an idle phrase or a mere platitude. With several companies in the country just such efforts are being made and are bearing fruit, and it is one of the promising features of present-day operation that such is the case.

A real start has already been made and lines of progress have been outlined that point the way for further development of co-operation between the owners and operating officers on the one hand and the men whose work they direct on the other. With these good beginnings as a guide, much greater advancement can be forecast. A study on the ground of some of the companies which are doing this intelligent work of co-operation would well repay the executive officer of any company, irrespective of whether, in his judgment, conditions are such that he can adopt the policy or not. Any steps that can be taken to increase the interest and loyalty of the men to the organization in which they earn their living will tend to improve the quality of service rendered the public. Thus one of the problems which face the management of all our companies is to promote this sense of loyalty and to foster it, by making the conditions under which the men have to do their work as satisfactory and attractive as possible.

In the years that we have just passed through it was right and necessary that wages be increased substantially. Now, however, during the period of downward readjustment to a condition of continuous normal business, the whole country is facing reductions in wages and salaries. No one likes to accept a decrease in the money that he has been earning, but any man will take it with better grace when he understands the basic conditions which force the reduction. The companies which are taking their employees into their confidence and letting them understand the difficulties of the present-day situation are, I believe, able to make cuts in compensation paid, with less difficulty and without impairing the cordial relations existing with their operating force. Where this has been done, it speaks volumes for the methods of the company and furnishes added proof of the beneficial results that accrue from co-operative plans.

One important advantage that people working for a street railway have over those in many other lines of business is permanence of employment. The truth of this has been illustrated since the let-down from the feverish activities caused by the war. Even with diminishing earnings the street railway companies have gone along retaining most of their employees, keeping their service moving and so providing continuous employment, whereas many other kinds of industry have been almost completely shut down. This advantage has been thoroughly emphasized as the result of the experience of the last twelve or eighteen months, and it has increased the spirit of contentment with their work on the part of the men fortunate enough to be employed in the electric railway business.

I cannot but feel that the influence of this development is going to persist for a long time and that it will mean a better class of men seeking work with us, a reduction in turnover and an increase in the interest that the men take in their work. I view it as one of the favorable by-products of the war period which is reacting in our favor.

DESIRE FOR STANDARDIZATION MUST NOT CLOG THE WHEELS OF PROGRESS

In the recent past much has been said and written concerning the safety features of one-man car operation, and it is unquestionably true that the development of the safety devices has been one of the principal factors in making the operation of one-man cars satisfactory to the public and the public authorities. Here in Baltimore we have had something to say concerning the faulty design of the original standard car. As the result of experiments made in a number of other locations, as well as here, we determined when purchasing our second lot of one-man cars to depart somewhat radically from the designs recommended by the car builders and in general use heretofore. Several months operation with these cars of modified design, *i.e.*, wider aisles and separate exits and entrances, has so justified our original contention that recently we have made another substantial purchase of these cars of the newer type.

I believe that the advocates of the standard car unfortunately have clung too persistently and unyieldingly to their old design. It is another example of the "stand-pat" tendencies that so frequently clog the wheels of progress. One of the difficulties of standardization, as we all know, is to crush the spirit of initiative. Any one who observes this newer model in service, as compared with the older type, will be struck with the much better facilities offered the public. In other words, the question of safety of passengers still being adequately cared for, the new car "merchandises" transportation much more efficiently and satisfactorily to our patrons.

Under such conditions there is absolute justification for departure from the old standard, and I hope for the benefit of the industry, in its desire to handle the car rider most satisfactorily, that before others purchase cars of the so-called standard type, they will come to Baltimore and give us an opportunity to show what we believe is a conclusive demonstration of the improvements over the earlier type of one-man cars. I feel this newer design is better, not only for larger cities, but for the smaller towns. This is one of the topics to which the one-man car committee of the Transportation & Traffic Association is to give further consideration in its report for the convention next October.

THE RAILWAY COMPANY SHOULD SUPPLY ALL THE TRANSPORTATION NEEDED

A basic theory of public utility regulation is that light and heat companies and electric railways are natural monoplies, besides being quasi-public concerns, and that therefore some measure of public control must be imposed upon them. This principle was quite generally accepted and went along upon what might be called a normal course until the appearance of the motor bus, particularly the jitney, "spilled the beans." Due largely to political rather than to economic conditions, the situation developed in such ways that the "natural monopoly" theory received some bad dents and got more or less scratched. The much regulated and highly respectable (shall I say satisfied?) street railway operator looked upon the jitney as a pest and a nuisance. He refused to consider it as a forerunner of a development that might hold great possibilities for service to the community, and generally and frequently got himself into such a "stand-pat" condition that he refused to admit that there was any good at all in trackless transportation vehicles. Gradually, however, the situation has been clarifying, and we have come to realize that the most efficient railway utility is that which provides all of the transportation needed by the community it serves, whether it is on rails, underground, surface or elevated, or on rubber tires.

I know of no reason why the electric railway operator cannot run motor buses or trackless trolleys at least as efficiently as any other man in his community, and certainly he ought to be able to do it better. Further, I am firmly convinced that the best interests of cities demand that the whole transportation furnished the communities should be in the hands of one responsible agency, to which the people can look and on which they can depend, for the character of service to which they are entitled.

Many claims which cannot be substantiated are being made and scattered broadcast, to the effect that motor buses are going to supplant the trolley car, whereas those who have studied the problem of mass transportation know that it is not a case of *supplant* but a case of *supplement*.

We should be alive to and abreast of this rapidly developing situation and should see to it that the company which each of us represents is taking such forward steps as will preserve to it the function of furnishing complete transportation. We must be studying the problem so as to know what the best kind of transportation is for the various districts that each of us serves.

There is an active committee on trackless transportation of the American Association, with co-operating committees from both the Engineering and Transportation & Traffic Associations, and during the year they expect to make progress in their study of this broad problem.

I consider it impossible to place too much emphasis upon the premise that the street railway company should furnish all the transportation needed for its community, and that it matters little whether this is on rails or on rubber tires.

We need to be in the forefront of this movement for the following among other reasons:

1. To give the people we serve what they need and want, and
2. To protect our investments and interests.

But it is the first idea that I wish to stress again. It includes the phrase "merchandising transportation" in its broader sense, and it will mean much for the industry as a whole, if we will adopt this constructive, far-sighted and forward-looking attitude in dealing with the so-called vexed question of trackless transportation.

THERE EXISTS A NATIONWIDE NEED FOR TRAFFIC REGULATION

There is one other committee of the Transportation & Traffic Association that has performed a notable service to the industry during the past three years, and I would like to mention its work briefly, before closing this discussion. The subject is that of traffic regulation. With the increasing use of the highways by self-propelled vehicles, and particularly the interstate movement of these vehicles, a real need has arisen for the co-ordination of rules, signals, signs and general regulations for the guidance of automobile drivers. With the co-operation of a number of other national associations, including that of the traffic officers, a forward step has been accomplished in the development of the standard code for the regulation of traffic. Study is now being made to determine the possibility of having uniform signals, signs and general regulations adopted for the country as a whole, and it is most desirable to attain this object. Our committee has had a part in the constructive work so far accomplished, and it is prepared to assist in the further steps that should be taken in the near future.

THE FIELD FOR CONSTRUCTIVE WORK IS ENORMOUS

Viewing the field of our work as a whole, I am impressed with the possibilities for constructive work that lie just ahead of us. The developments that affect our business are of great extent and require constant study and watchful attention, in order to diagnose them and apply the most effective methods of increasing our usefulness.

I believe it augurs well for the future of our industry, and with it the work of our association, that we are continuing to meet and study the problems as they arise, looking to their successful solution in order to be prepared to take up those that succeed. The horizon is constantly enlarging, and since the trials of the last few years have been successfully overcome, we realize our industry has a bright future and it rests with us to assure its consummation.

One of the potent instrumentalities for the task that I have outlined in this article is the American Electric Railway Association and its affiliated bodies.

The Engineering Association and Its Plans

Internal Problems Are to Be Taken Up by a Committee on Reorganization—Other Committee Activities and Problems Are Outlined—Participation Is Urged in All National Standardization Movements

BY C. S. KIMBALL
President American Electric Railway Engineering Association

ONE of the most important acts of the president of an affiliated association is the appointment at the beginning of the association year of members of the different committees of the association. The executive committee decides on the number and assignments of the committees, and members of the executive committee often advise as to the make-up of the working committees for the year. Nevertheless the responsibility is on the president, and it is an important one because the work of the association for the year depends largely on this selection. This responsibility is placed upon the president at the beginning of his term of office and must be completed within a comparatively short time so as to permit the committees actively to begin their work as soon as they can.

This year, before any members of committees of the American Electric Railway Engineering Association were appointed, the writer, with Mr. Welsh, made a careful canvass of all possible committee members, thought being given not only to experience in the subject matter to be taken up by the committee but also to the question of geographical distribution so as to have representation from all parts of the country so far as possible, consistent with chances of good attendance at committee meetings. The question of appointment was then taken up with each individual member.

CHANCES IN COMMITTEE AND OTHER ASSOCIATION WORK

From one standpoint, the committees of the Engineering Association might be criticised, namely, from that of size. Of the eight committees so far appointed, one has a membership of seventeen, one of sixteen, one of fifteen, two of fourteen, one of twelve, one of eight and one (that of purchases and stores) of seven members. It is true that a committee of sixteen or seventeen is a large committee and might be considered by some to be rather unwieldy but there are reasons in the Engineering Association for large main committees. One of these is that it is the practice to have on each main committee a number of small committees to take up individual assignments of the work, and these working sub-committees in which most of the detail work is done are small. Another reason is that in committees of the Engineering Association, more than in any other, the representatives of manufacturing companies are particularly appropriate because of their expert knowledge in regard to engineering matters. Hence, on each of the committees of the Engineering Association, except on the committees on purchases and stores and on uniformity of car design, there is a considerable number of manufacturing representatives. As it always has been the policy to put on each such committee an equal or greater number of railway men, the committee becomes unavoidably rather large.

An important departure in the practice of appointing committees adopted this year has been in the appointment on each committee of a sponsor from among the members of the executive committee. It should be understood that this sponsor acts as an adviser only to the committee, and his appointment does not relieve the chairman of the committee of any of his responsibility for the work of the body. Nevertheless, four notable advantages are gained by the appointment of these sponsors. The first is that it changes the work of the executive committee member from one of being largely in a consulting capacity to one of active participation in the work of the year. In the second place, it enables the executive committee as a whole to keep very closely in touch with the progress of the committees so that it knows exactly if a committee is getting along as well as should be expected. In the third place, it gives the committee the benefit of expert advice, because many of the members of the executive committee thus acting as sponsors have in the past been chairmen of committees. Finally, as the sponsor is supposed always to be in attendance at the committee meeting, there is automatically present some one to take charge of affairs in case the chairman and vice-chairman are away. Thus, greater latitude is allowed for the appointment of a chairman residing some distance away from New York.

One or two committees are to be appointed in addition to those whose names are scheduled on page 960 of the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 26. One of these is a committee on trackless transportation to work in connection with a similar committee to be appointed by the T. & T. Association. Another committee to be appointed is that on reorganization. The purpose of this committee will be to study the existing form of organization and methods of work of the Engineering Association and its relation to the American Electric Railway Association, to see whether there are any improvements that can be made to promote efficiency. The appointment of such a committee naturally follows the suggestions made by Mr. Gove in his presidential address last October. By resolution of the executive committee, the committee on reorganization will consist of five, to be made up of members of the executive committee and past-presidents of the association.

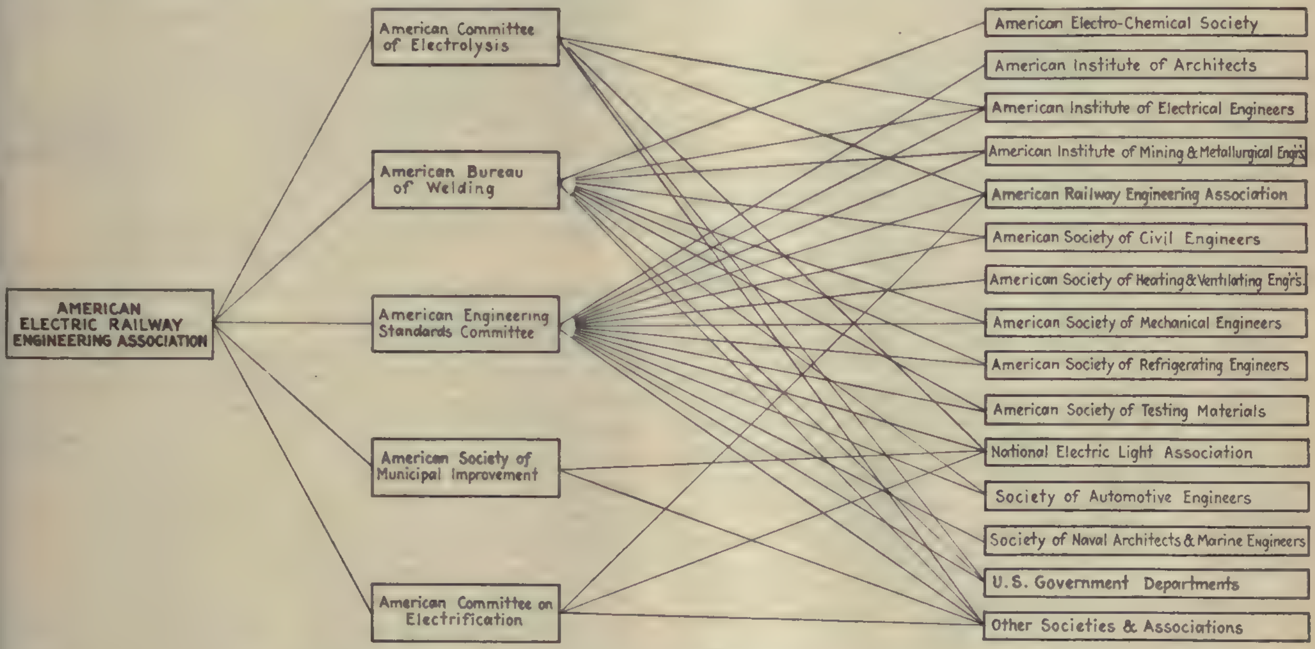
Action on two of the points made by Mr. Gove have already been taken by the writer. One of these was to determine whether there might not be at the association headquarters in New York an engineering assistant to Mr. Welsh. There is much that such an engineer could do besides work directly connected with the Engineering Association. Much of the information required by the membership of the association as a whole is of an engineering nature, or of the nature of engineering statistics. The great benefits to the association as a whole of having at its disposal and in its employ a first-class engineer capable of tabulating statistics of this kind were shown in a striking manner at the time of the hearings of the Federal Electric Railways Commission.

Here, Mr. Welsh, then engineer of the association, was able to compile and present to the commission statistics which were invaluable in proving the position taken by the electric railways. The other duties now required as secretary of Mr. Welsh make it impossible as a practical matter for him to carry on all or a greater part of this engineering work, except to act in a supervisory way. This is the basis for the desire of the Engineering Association that an engineering assistant to Mr. Welsh should be appointed at the New York headquarters. Such a man could also assist in making up data sheets and tabulating the statistics obtained from them, and in this and other research work which he would do he could often compile advance data for companies needing information on special topics before the final results of an investigation were actually completed and published by the association or by the committee engaged on this special problem. This assistant could also take care of the detailed engineering correspondence at association headquarters and help in many other ways.

Another suggestion made by Mr. Gove in his presidential address last October was that the traveling expenses of committee members in attendance at the committee meetings should be paid by the association where the member company with which that committee member is associated declines or is unable to pay these expenses. It was hoped, by means of such an arrangement, that committee membership would cease in some cases to mean a serious tax on the individual purse of the committee member, and thereby the association would be able to command the services of the best men for committee members. Of course the committee work to which such a condition applies consists not only of the work of technical committees but as well any other work done for the association such as choosing a convention location or representing the association at a meeting of a national committee.

If such a plan was adopted it might be coupled with a proviso that such expenses payable by the association should be limited to railroad transportation. This whole question has been presented to the American Association and has been referred to the finance committee of that association.

A problem was encountered in connection with the heavy electric traction committee of former years. As there are now few steam railroads with electrified sections which are members of the association, only a limited number of employees of an electrified steam railroad are available for appointment on the heavy electric traction committee. If the American Electric Railway Engineering Association is to continue its important work along heavy traction lines, some change in the constitution is necessary. One suggestion made has been to establish a special class of individual membership to consist of employees of electrified steam roads at dues probably somewhat higher than that of individual membership for employees of member companies. Another suggestion is that these individual members might be admitted as consulting engineers. It is hoped that this matter will be decided soon because activities should be started promptly on the work of the committee on heavy electric traction.


AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION
American Committee of Electrolysis
American Bureau of Welding
American Engineering Standards Committee
American Society of Municipal Improvement
American Committee on Electrification
American Electro-Chemical Society
American Institute of Architects
American Institute of Electrical Engineers
American Institute of Mining & Metallurgical Engr's
American Railway Engineering Association
American Society of Civil Engineers
American Society of Heating & Ventilating Engr's.
American Society of Mechanical Engineers
American Society of Refrigerating Engineers
American Society of Testing Materials
National Electric Light Association
Society of Automotive Engineers
Society of Naval Architects & Marine Engineers
U.S. Government Departments
Other Societies & Associations

THROUGH PARTICIPATION WITH VARIOUS NATIONAL ENGINEERING ORGANIZATIONS THE AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION IS ASSISTING IN THE ESTABLISHMENT OF NUMEROUS NATIONAL STANDARDS*

One complaint which has been made in regard to the work of the committees of the Engineering Association in the past has been that too large a program has been assigned to them by the executive committee. It is impossible always for the executive committee to know in advance the extent of the work which a committee can do, but to avoid overloading the committee the chairmen now have permission to report on such subjects in their assignment as they think they can satisfactorily cover, and are empowered to refer to following committees all subjects in their assignments which they have neither the time nor opportunity to investigate.

Developments during the past few years, especially during the past year, have made the standardization work of the Engineering Association of vastly more importance than ever before. Heretofore, the standardization done by the association has been confined principally to the approval or disapproval by the standards committee of the standards which have been recommended for adoption as such by other committees of the Engineering Association. Recently, however, there has been a widespread movement through the entire country toward the creation of national engineering standards through co-operation with and under the direction of the American Engineering Standards Committee. This is largely the outcome of the standardization brought about in this country, as well as abroad, during the exigencies of the war to increase output. It is now realized by industrial leaders as an equally potent factor toward national prosperity in peace.

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*The "American Committee on Electrification" has not yet actually been formed. For this reason, in the diagram the committee is shown in relation specifically only to the steam railroad and electric light associations, although, of course, as suggested in the article, many others will be asked to co-operate.

ENGINEERING ASSOCIATION IS CO-OPERATING IN ESTABLISHING NATIONAL STANDARDS

The American Engineering Standards Committee is made up of representatives appointed by the leading engineering associations in this country and other organizations aggregating about 150 in number, and the American Electric Railway Engineering Association, as a national engineering association representing an important industry, has been asked to take part in this work. This it is glad to do. In fact, some members of the engineering association have expressed themselves strongly that it is not only the privilege and the right of the Engineering Association actively to take part in the deliberation of such standards but it is also its duty so to co-operate. Otherwise there is always a possibility that without intending such a result the decision of a group of men not entirely connected with electric railway engineering, or subjects in which the electric railway is concerned, may either result in the omission of important requirements or the inclusion of requirements which may prove adverse to electric railways. The representative of the Engineering Association on the American Engineering Standards Committee at present is Martin Schreiber.

In addition to Mr. Schreiber as representative on the main committee, the American Electric Railway Engineering Association has representatives on sectional committees of the American Engineering Standards Committee developing standards for pipe flanges and fittings, lightning protection, ratings of electrical machinery, wires and cables, and terminal markings. This work is rapidly assuming large proportions and some means of co-ordinating this work and keeping the various standing committees of the Engineering Association advised as to its progress is necessary. For instance, the sectional committee on wires and cables is providing for a technical committee to assist in its work. The various standing committees of the Engineering Association directly interested can and should have representatives on the technical committee and so be kept informed of the progress of the work and offer suggestions for important requirements. Some such organization of other committees may be found desirable.

Another national engineering committee on which electric railway interests may be represented during this coming year is the American Committee on Electrolysis, and the Engineering Association has been asked to appoint three representatives on the research subcommittee of this national committee. This request was made as the result of an invitation addressed by the Electrolysis Committee, to the American Electric Railway Association that the association should make a study of the cost of systems designed to minimize railway rail drop, and that it take the sponsorship for this study, working in co-operation with the research subcommittee of the American Committee on Electrolysis.

Still another national engineering movement in which electric railway interests are prepared to participate is a proposed American Committee on Electrification. The plan is that the American Railway Engineering Association, the American Railway Association—Mechanical Section, the National Electric Light Association, the American Institute of Electrical Engineers, the Association of Railway Electrical Engineers, the American Electric Railway Association, and such other organizations as might be willing to co-operate, shall appoint each two members to form an American Committee on Electrification. The purpose of this committee is to co-ordinate the activities of these several associations in collecting data regarding heavy electric traction and in other ways promote the study of this subject.

A chart is presented to show in a graphic way the points of contact between the Engineering Association and the other national associations through this joint work.

STANDARDIZATION OF TIES, WIRE AND OVERHEAD CROSSINGS

Another example of the united action of national organization standardization is the standardizing of railroad ties. A very interesting conference was held in Washington on Oct. 25 by the American Engineering Standards Committee, and sponsors were appointed to investigate this subject. Our association is a member of the sectional committee. The industry is vitally interested in this subject, and undoubtedly great good will result in a uniform standard for railroad ties.

Still another question which has arisen is that of the conductivity standard for aluminum. This matter is now in the hands of the American Engineering Standards Committee, and our association will have representation thereon. The tentative conductivity standards for aluminum are as follows:

PART I

(a) *General:* The following shall be taken as normal values for standard aluminum:

(b) *Resistance:* At a temperature of 20 deg. C. the resistance of a wire standard aluminum, one meter in length and of a uniform section of one square millimeter, is 0.02826 ohm.

(c) *Density:* At a temperature of 20 deg. C. the density of standard aluminum is 2.70 grams per cubic centimeter.

(d) *Temperature Coefficient of Resistance:* At a temperature of 20 deg. C. the "constant mass" temperature coefficient of resistance of standard aluminum measured between two potential points rigidly fixed to the wire is 0.0039 per degree centigrade.

(e) *Resistance of Standard Aluminum at 20 Deg. C.:* As a consequence it follows from (a) and (b) that at a temperature of 20 deg. C. the resistance of a wire of standard aluminum of uniform section one meter in length and weighing one gram is 0.0763 ohm.

PART II

The conductivity of all metals shall be expressed as a percentage of that of the annealed copper standard.

Another example of united action in the direction of national standardization is in connection with standard construction at overhead crossings, *i.e.*, the provision for electric light and power wires at steam railroad crossings. In this case also the participation of the Engineering Association has been requested.

How Trainmen's Working Conditions Affect Railway Operation

Major Provisions of Labor Agreements as to Platform Work on Twenty-four Large Railway Properties Are Summarized and Tabulated for Comparison—Information Valuable in Study of Present Contracts with View to Elimination of Extravagant Requirements and Wasteful Practices in Future

BY "EXECUTIVE"

RESTRICTIONS in the working conditions imposed by labor unions, or awarded in arbitrations, have a very important influence on both the cost and quality of service given by a street railway. This thought was greatly emphasized by a recent inquiry which developed the fact that some companies pay as high as 18 per cent of their total platform expense for non-revenue time. While the day has passed for companies to impose any real hardships on their platform men and few managements would go back to old conditions of pay and work, yet it is obvious that such excessive non-revenue labor cost as cited is indicative of unreasonable working limitations.

The conditions now in existence perhaps represent the extreme in things favorable to the trainmen and it is to be expected that in negotiating new arrangements the companies will establish conditions less extravagant. Some of the more alert managements have already done this. With circumstances favoring its hand, labor has made the most of its turn and has carried both wages and working conditions to unprecedented extremes. But now there is opportunity for managements to secure more reasonable terms—terms more in keeping with the peculiar requirements of the transportation business. For while certain of the ideals of unionism may be practicable and good for other industries, they impose what in reality is unwarranted waste when applied to the transportation business. Men in the public service, and particularly in the transportation business, cannot expect to derive the same measure of convenience in their labors as in many private industries, for the inherent nature of the business involves some circumstances which have to be met even though undesirable. These things, within reason, must be accepted as a part of the job, without expecting such concessions as cannot help but incur excessive operating costs, consequent higher fares and a lowering of the measure of service to the public. The unpleasant parts of railway employment, however, are possibly more than offset by the steady and healthful nature of the work and by other minor advantages.

In an effort to study out ways and means of fairly eliminating wasteful practices as imposed by present labor agreements, one of the most important steps is to find out what conditions now prevail with other companies. Accordingly, an analysis of the major contract requirements, or the practice followed where the company does not contract with its men, has been made for twenty-four of the larger electric railway companies and is presented herewith in tabular form for convenient study and comparison. For obvious reasons the companies covered are not named, but are indicated by letter. A study of the table will disclose that some companies are burdened only in certain conditions, while others have costly requirements under practically all features of the agreement. Much of the information presented was obtained only as the result of a questionnaire calling for definite answers, as a study of the contracts does not give a clear understanding of the working conditions, partly because of the difference in the terminology used.

Of course in comparing the working conditions on different properties, due allowance must be made for variations in such local conditions as length of route, running time, variation and intensity of street traffic throughout the day and night, and number of cars operated in the rush and non-rush periods. Nevertheless, the information presented herewith may be very helpful, and if it does no more than to inspire a checking up on present contract limitations, it will have filled its mission.

Street railway work, above all other kinds of employment, is one in which the quantity of the product manufactured must at all times meet the demand and no more. Insufficient service at one hour cannot be made up at another hour, and an excess of service at any time is a dead waste. So the traveling habits of the public, which is the guide in schedule building, must be closely and continuously followed. In thus adjusting service, if the requirements of a contract with trainmen make it impossible to serve the public demand without too great a penalty in the way of bonus allowances, a heavy burden is thereby placed on the cost of operation, and the public as well as the company must suffer.

ELECTRIC RAILWAYS AND THE EIGHT-HOUR DAY

Take, for instance, the provision for a straight eight-hour day for 60 per cent of the runs on one large property. This was forced by a compromise following a strike several years ago. It is understood that 2,000 additional platform men had to be employed by the company to put this into effect. The great majority of people, of course, ride in the few rush hours of the morning and evening, and these peaks are so separated that a straight eight-hour run cannot serve both. The result of the straight eight-hour provision, then, is the necessity to employ more men, with a consequent substantial increase in the cost for the same amount of service. Only a very few companies have submitted to an eight-hour basic day, as it is impossible to adapt the street railway business to that basis without introducing what seem to be extravagant though unavoidable platform costs. Of the twenty-four sets of conditions analyzed here, only two companies have an eight-hour day, but only one of these has strictly a straight eight-hour day; four are on a nine-hour basis, five have a definitely prescribed maximum above nine hours, and

Tabular Portrayal of Working Conditions in Effect on Twenty-four of the Large Electric Railways in the United States

Company	Maximum and Minimum Hours	Extra Rate for Overtime	Limit of Spread of Hours	Straight Runs	Reporting and Turning in Time	Meal Reliefs and Fall Backs	Terminal Time	Company
A	10½ hr. max.; 9 hr. min.; 6 hr. min. for extras.	1½ time for work in addition to regular runs with min. of 1½ hr.	44% of runs must be within 14½ hr.	56% of runs must be completed in 10 hr. on week days.	No allowance.	No allowance.	6¾%; try not to exceed 8%.	A
B	10-hr. max. for regulars; 6 hr. min. and no max. for swings; 1 hr. min. for trippers; $40 a mo. min. for extra men.	1½ time week days for time in addition to all regular runs; 1½ time Sundays and holidays for over 8 hr. or over regular runs.	Swings after 13 hr. get bonus of 15 min. 1st. hr., same for 2nd hr. and 30 min. each hr. thereafter.	None on week days.	10 min. for first report only.	No allowance.	4% long runs; nothing short runs.	B
C	8 hr. max. and 8 hr. min. for regular and extra men.	Time and one-half after 8 hr.	Must have 40% of runs completed within 14 hr.	60% of runs must be straight.	10 min. for first report; 10 min. for second report; 7 min. for turning in.	Average of 25 min. for fall back, or not over 30 min. for meal relief.	10%.	C
D	As near 10-hr. day as possible; 6 hr. min. for any run including trippers, but required to work any run or trip and may be required to do additional work within 13 consecutive hr.	1½ time week days after regular run; 1½ time Sundays and holidays after regular run.	All but swings within 13 hr.	15.7% straight; no limit on per cent of runs over 2 pieces.	5 min. for first report; 5 min. turning in.	No allowance.	4 min. on all runs; about 10%.	D
E	As near 9 hr. as possible for day runs; 8½ hr. or more constitute late run; no guaranteed min. except $100 a mo. for extra men.	None.	No limit.	No limit.	Conductors allowed 5 min. turning in.	13 min. drop back.	5 min. on all round trips.	E
F	None fixed; regular runs over 8 hr.; $110 a mo. min. for extra men.	None.	60% in 13 hr.; 20% in 14 hr.; 15% in 15 hr.; 5% in 16 hr.	No contract; only stub runs are straight; no limit on over 2-piece runs	5 min. first report; 5 min. second report; 5 min turning in.	No allowance.	3 min. each end of each trip.	F
G	None fixed.	1½ time for work in addition to regular runs.	70% of "straight" in 13 hr.; 90% of swings in 15 hr.	No guaranty; no limit on number of runs over two pieces.	10 min. first report; 10 min. second report 5 min. turning in.	No allowance.	2 min. each end.	G
H	None fixed.	1½ time for "platform time" after 12 hr.	Pays bonus for spread over 14 hr. as follows: ¼ the excess over 14 to 15 hr. spread; 15 min. plus ½ the excess over 15 to 16 hr. spread; 45 min. plus ¾ the excess over 16 hr. spread and up.	No agreement, but 57.7% are straight	5 min. for second report; 10 min. turning in	15 min. for dinner; 20 min. for supper.	11%; min. of 5 min. at home barn and 1 to 2 min. at other end.	H
I	No max. fixed; 9-hr. min. guaranteed; extra runs guaranteed $2.19.	1½ time for excess over 9 hr. after 10 hr. work.	50% in 11 hr.; 40% in 12 to 13 hr.; 10% in 14 hr.	None.	7½ min. first report; 7½ min. turning in.	No allowance.	Not over 4 min.	I
J	No max. fixed; regulars guaranteed 8 hr.; extras guaranteed 5 hr.	1½ time for spread over 11 hr. for earlies and lates; 1½ time after 14 hr. spread for swings; 1½ time after 8½ hr. on holidays but not on Sundays.	75% in 12½ hr. and swings in 15 hr.	No "one piece" runs.	No allowance.	No allowance.	5% to 7%.	J
K	No max. fixed; min. 9 hr. for regulars, $4.30 a day for extras.	10c. per hr. after finishing schedule runs.	40% of regular runs in 11 hr., 20% in 12 hr., 40% in 13½ hr.; extras have no limit; 15½ hr. is max. involved.	35% straight is the practice.	10 min. first report; 10 min. turning in.	No allowance.	5% to 10%.	K
L	None fixed; $2 a day min. guaranteed for extras.	None.	60% of regulars not exceeding 11 hr.; 30% not over 14 hr.	No contract; practice about 50% straight; no limit on over 2-piece runs.	10 min. first report.	No allowance.	1 to 3 min. with layover at only one end and 2 to 4 min. for 2 ends.	L
M	No max. guaranteed; min. of 8 hr. for all, including extras who report.	1½ time for work in addition to regular runs.	60% within 11 hr.; 30% within 14 hr.	None required to be straight; 7% are over 2 pieces; 30 min. or less between pieces are paid for.	Motormen, 5 min. first report, 5 min. turning in; Conductors 5 min. first report, 10 min. turning in.	No allowance.	10% to 20%.	M
N	9-hr. max.; 8 hr. min. for regulars; 6½ hr. min. for extras.	1½ time after completing schedule, which may be over 9 hr.	Early regulars, 11 hr.; lates 12 hr.; extras 13½ hr.	None; regular runs are two-piece; extra runs may have three pieces.	Same as next above.	No allowance.	....	N
O	8 to 9½ hr. max.; 8 hr. min. for regulars.	Not stated.	11 to 15 hr.; 80% in 12 hr.; no regular runs over 14 hr.; 20% excess time first hr. and 35% thereafter is added for regulars after 12 hr. spread; extras get 25% excess time for first hour and 45% thereafter after 14-hr. spread.	No straight runs, but 80% within 12 hr.	No allowance.	For man relieved less than 1 hr. company pays up to 60c. for meal.	....	O
P	No max.; min. of 8 hr. for regulars; actual time for extras.	None.	After 14 hr. spread, extra men get extra ¼ hr. 1st hr., ½ hr. for second	39% straight; 46% two-pieces; 15% extras.	No allowance.	20 min. paid on each run for meal-	10½% of total time.	P

Q	As near 9 hr. as possible; no guarantee as to min. but pay min. of 8 hr. week days, 6 hr. Sundays; extra men actual time.	1½ time for work in addition to regular runs and for short trippers; also ¼-hr. extra for spread over 14 hr. to 15 hr., ½ hr. over 14 to 16 hr., 1½ hr. extra for over 14 hr. to 17 hr.	99.96% in 15 hr.; 100% in 16 hr.	Week days 15%; Saturdays 63%; Sundays 99% straight.	No allowance.	12 min.	6% to 7% of running time; short runs 2 min., long runs 6 min.	Q
R	10 hr. max., 9 hr. min. for regulars; 2 hr. min. for extras.	1½ time for regulars after regular run; straight time for extras.	10 hr. for straight runs; no limit for extras.	All runs straight; no limit on other than two-piece runs operated as trippers.	5 min. first report.	No mention.	10% of running time; allow 5 min on long runs and 2 min. on short.	R
S	No max.; no guaranteed min.; trippers working over 5 hr. get 9 hr.	1½ time for schedule, but straight time for additional work.	11 to 15 hr.; 74% in 12 hr.; 18% in 13 hr.; 8% in 14 hr.	No limit.	No allowance.	No allowance.	. . . .	S
T	No max.; no guaranteed min.; regular runs average 9½ hr.; extra men making all regular reports get min. of $100 a month.	None.	Try to keep within 15 hr.	Regular runs are straight; no limit on runs over two pieces.	Motormen 10 min. first report; conductors 10 min. first report and 15 min. turning in.	No allowance.	7% incl. 1 min. for reporting; 4% not incl. the 1 min.; 2 min on 1- or 2-end lines.	T
U	No max.; min. of 9 hr. for regulars, 6 hr. for extras.	1½ time for work over schedule; owl runs 8 hr., pay 9 hr.	60% in 12 hr.; 40% have no limit.	No straight runs except on night cars.	5 min. first report; 5 min. second report; none for turning in.	No allowance.	2 min each end.	U
V	No max.; min. of 6 hr. for regulars, $20 a week for extras; all runs over 6 hr. and under 9 hr. must be paid at maximum rate.	1½ time for work over schedule; unscheduled passenger service pays 1½ time over 9 hr.	50% in 10 hr.; 20% in 11 hr.; 20% in 12 hr., 10% in 13 hr.	50% of regular runs are straight.	Motormen get 5 min. for turning in.	No allowance.	7.47%.	V
W	9 hr. max. with leeway of ½ hr. to complete schedule; guarantee of 9 hr. min. to regulars and 6 hr. to extras; extras called Sundays get min. of 5 hr.	Extra men 1½ time for work after 10 hr. Sundays and holidays.	60% of regular runs in 11 hr.; no regular to exceed 14 hr.; extra men not on scheduled runs get 10c. per hr. bonus after 13 hr.	No mention in contract.	No allowance.	No mention.	. . . .	W
X	8 hr. max. week days, 6 hr. Sundays; min. of 8 hr. for regulars and 5 hr. for extras.	1½ time for work over regular run.	35% in 9 hr.; 45% in 12½ hr.; 20% in 14 hr.	Week days 35% straight; Sundays, 70%.	7½ min. first report; 7½ min. turning in.	No allowance.	. . . .	X

the remainder, thirteen, have no fixed limit. A good indication of the practical inability to carry out the straight eight-hour day in the transportation business without unduly high costs is found in the recent decision of the Railroad Labor Board, which, while indorsing the eight-hour basic day, ordered that extra pay for overtime shall not begin until after ten hours work.

As to the attitude of individual trainmen on the eight-hour maximum day, it is frequently the case that where they have a choice between a short and a long run, they choose the latter, and where the straight eight-hour day enabled an employee to complete his work early, he often sought other work so as to add to his daily earnings. From the humanitarian standpoint there can be no argument against protecting the workman from unreasonable working conditions, but if the men are really seeking a shorter workday with higher pay so that they may take on other jobs the camouflage should be removed.

MANAGEMENT HANDICAPPED BY SHORTENED WORKING DAY

Consider also the effect of an eight- or nine-hour minimum day which prevails on many properties. A few years ago an emergency demand for service could be met by sending out additional runs for a few hours, morning and evening, or at any time of day. Now, such runs would have to be paid the guaranteed minimum, thus raising another item of cost out of all proportion to the possible additional revenue. This makes the manager hesitate to furnish the needed service, especially in these days when every dollar has to be counted more carefully. The minimum pay requirement is commonly existent, especially for regular men, and there is good basis for some minimum provision from the standpoint of the men on the extra list. It would seem, however, that a minimum of eight hours or more works a severe hardship on a management in trying to meet fluctuations of traffic, and puts the new man on a pay basis which leaves little in the way of advancement for him when finally given a regular run. Or, looking at it the other way around, the old, experienced, proved man gets little more compensation than the newcomer whose services are usually costly to the company during his first six months or more. Up to the advent of the War Labor Board, in 1918, five years or more were required to reach the maximum rate of wage, so that there was a reward to the steady, experienced men. But the board set all this aside and the maximum rate of pay is now quite generally reached in one year. While the union principle is for equal pay regardless of efficiency or worth, it is fundamentally wrong and this should be borne in mind in negotiating the minimum day provision.

In studying this matter of maximum and minimum hours for trainmen, the other important factors of overtime allowance, per cent of straightened swing runs required and the spread allowance must be kept in mind. The maximum workday is not a real hardship on a company in the building of schedules if it can be stretched slightly without penalty. It becomes an important item, however, when the penalty is fixed at time and one-half or even time and one-quarter for time worked immediately over the maximum stipulated. Of course, the shorter the maximum day the more difficult it is to handle the schedules without much overtime or excessive bonus time, and the more severe the overtime penalty becomes. Similarly, a swing run is little better than a straight run if the spread allowance is not sufficiently liberal to permit covering two peaks of a day's service with one crew.

Another costly item is the allowance for reporting and turning-in time. One company allows a total of twenty-seven minutes for this purpose. Some companies make no allowance, while others appear to take care of the necessities by a total concession of ten or fifteen minutes.

The matter of "meal reliefs" on one property amounts to an average of twenty-five minutes per man per day with pay. This is not allowed by most of the companies. It has a decided disadvantage aside from the cost of the time not worked, because persons waiting for cars get a bad impression of the diligence of the management if they see cars waiting at terminals for a long period while the men are eating.

The same criticism applies to excessive layover time at the end of a trip, which, with close headway, keeps a group of several cars at the end of the line. Not only does this give the impression of wasteful management to the layman, but the "jockeying" around of the cars often leaves the patrons in doubt as to which is the first car to leave and thus produces a source of annoyance and ill feeling. Layover time is not a contract matter with any company as far as is known. It has been developed on the basis of experience and the demands of the men, and varies with the length of route, congestion, number of railroad crossings, etc. Its purpose is to provide time for turning cars and for the comfort of the men, and for making up unusual delays. Thus, while there is justification for a certain amount of leeway here, it is costly and should be kept to a minimum. When it is seen from the column "Terminal Time" in the accompanying table that there is a variation of from 4 to 11 per cent in this item with different companies, there is basis for directing serious thought to a reduction in this division of the non-revenue time.

In regard to the item of "traveling time," the practice of all companies seems to be to pay for the actual time between the car station and the point of relief. Some saving on this item could possibly be made by sending in the "defect card" by the relieving crew, permitting the turn-in to be made at the next reporting to the station, and allowing the crew to proceed directly to or from the point of relief or starting work. In connection with the work of instructing student trainmen, most companies give the instructors some extra pay, the average being 25 cents a day. A few companies have a provision for a minimum pay for the students. Most companies also pay extra for snow removal work, usually in the form of meal tickets.

PRACTICES ON TWENTY-FOUR RAILWAYS

The time allowed for making out accident reports varies from no allowance to actual time, or from a flat rate of twelve minutes to sixty minutes or from a flat sum of 10 cents to 20 cents. The average is about fifteen minutes for both motorman and conductor. A study made by one large company showed that the average time consumed in making out reports during one month was 40.6 minutes for the crew or 20.3 minutes per man.

In the matter of pay for night car work, of the twenty-four companies covered in this study, one pays 2 cents an hour higher than the day rate, two pay a bonus of two hours on an eight-hour run, one pays a bonus of one hour on an eight-hour run, one pays a bonus of one and one-half hours on a nine-hour run and the others pay no extra rate.

As to the time paid for between pieces of runs, nine companies make no allowance, four pay for the time up to sixty minutes gap, three pay for the time up to thirty minutes, two up to forty-five minutes and one up to fifteen minutes. The practice of the other seven is not known.

All of the items mentioned in the foregoing must be considered in conjunction. A manager might easily be led into an impossible situation by accepting conditions which, apparently innocent in themselves, become a real hardship when combined. Another point to bear in mind is that the policy of the Amalgamated Association has evidently been to force certain working conditions on one property so that this could be held up as a model feature for other agreements as they were renewed. Hence any laxness or weakness on the part of one company may affect many other companies. In the order of their importance for one large property, the principal items involving expenditures for non-revenue time are: (1) Terminal or layover time; (2) meal relief or fall-back; (3) reporting time; (4) bonus for over maximum or under minimum day and (5) turning-in time. This indicates the degree of effort that should be devoted to each in working for better economy.

IMPROVED WORKING CONDITIONS PREVAIL

On both union and open shop railways there has been a great and largely permanent improvement in both wages and working conditions for the trainmen. That this is realized by the workers is indicated by the following taken from a recent editorial from the *Union Leader*.

"We have seen the old dog treatment of men give way to a respectful, reasonable attitude. Men are no longer required to forego time for meals. Payment of damages for accident or breakage is unknown. Men may go where they please to buy uniforms and the days of buying brooms, stamping transfers, carrying excessive baggage, working on footboards, facing the storms without protection, or standing long periods until varicose veins rendered them almost helpless and shortened their lives are over with. We have experienced a complete transformation in operating methods and equipment."

Labor must do its share in the process of readjustment that is now going over the country. The employees on certain properties have shown a fine spirit and understanding of the changing conditions by voluntary acceptance of wage reductions, even despite unexpired contracts to the contrary. These employees and their executives are to be congratulated. Only short-sighted leaders will insist that high wages be maintained until cost of living reaches the pre-war level, because this level will never be approached if one of the important items of production costs is not reduced. Unemployment has reached formidable proportions throughout the country and wages, of course, must be influenced by the old law of supply and demand. New forces could be recruited from the idle millions at greatly reduced cost, and it is only by sensible compromise that those who are fortunate enough to have jobs can retain them. Fair concessions on the part of labor coupled with diligence and skill on the part of the managements should enable the electric railway industry to meet the new business conditions satisfactorily.

British Electric Railway Prospects

FROM OUR LONDON NEWS REPRESENTATIVE

The status and outlook for British electric railways, as outlined by Mr. McCallum, may be summarized as follows:

Railway electrification is greatly needed and the roads are ready with plans, but work is being held up by high interest rates. Some rapid transit improvements are under way. Tramways will do little new construction till prices fall. New routes are being operated by buses. Some reductions in tramway fares are being made. Negotiations are being conducted with labor to reduce the weekly guarantee.

IN AN article by the present writer which was published in the ELECTRIC RAILWAY JOURNAL of Jan. 1, 1921, an outline was given of what has been done in the past in the way of converting steam railways in England to electric traction and there was appended an indication of the existing schemes for further electrification. Since that time no further work of the kind has been put in hand, though the conversion of the London & North Western Railway suburban lines has been brought nearer completion. The condition of the financial world, the high rate of interest required to be paid for additional capital, the enormous cost of labor and materials (an aftermath of the war), the uncertainty of the future position of the railway companies after the removal of government control in August last, and latterly the amalgamation provisions of the railways act, which was passed last summer, are all reasons for the companies holding their hands in relation to new works of any kind. At the present time no improvement has come about in the rate of interest on loans, but the cost of labor and materials has begun to come down. The uncertainty of the position of the railway companies after the removal of state control has to a certain extent been lessened because the amount of compensation payable to the companies under agreements with the government has been fixed by the railways act, and so have a number of other things. The financial arrangements which will be necessary under the grouping or amalgamations provided for by the same act cannot, however, be definitely settled for some time. Practically all the railway companies in Great Britain except the London local railways are to be merged into four great groups or amalgamations. In most cases therefore these individual companies, for this among other reasons, hesitate to undertake large new capital expenditure until the consolidations and adjustments of existing capital are carried out. This process will take a considerable time. The companies are allowed (Section 2 of the railways act) till Jan. 1, 1923, to submit amalgamation schemes to the Minister of Transport, and after that the schemes have to go before an Amalgamation Tribunal set up for the purpose of considering them and coming to final decisions.

COMMITTEE'S REPORT WAS A STEP IN ADVANCE

A preliminary step, but still one in the direction of advance, was marked by the issue in the end of August last of the final report by an advisory committee of the Ministry of Transport on the electrification of steam railways. The committee, which consisted entirely of railway and electrical experts was appointed in March, 1920, to consider and report whether any regulations should be made for the purpose of insuring that the future electrification of railways should be carried out to the best advantage in regard to the interchange of electric locomotives and rolling stock, and whether any regulations should be made to limit the development of potential in uninsulated return conductors. The committee answered the last point in the negative, and in regard to the rest submitted a number of recommendations for standardized construction as to conductor rails, overhead wire conductors, etc., and recommended direct current traction at a pressure of 1,500 volts as standard. Various necessary exceptions and variations were specified. An abstract of the report was published in the ELECTRIC RAILWAY JOURNAL of Nov. 5, 1921.

This at all events cleared the way for developments on a uniform plan, so as to secure inter-running. The difficulty of making mutual arrangements will also be lessened by the amalgamations before referred to. As to the issue of regulations, this would probably not have been necessary inasmuch as the proposed standards emanated from railway experts and engineers. In any case, however, it so happened that the period of government control of the railways (which began with the beginning of the war) came to an end just about the time that the committee's report was issued. Since then the Minister of Transport has less power to regulate railways. There is, however, a provision in the railways act of last year which still gives some power to the minister in the matter. Section 16 says that the minister may by order require or authorize any railway company to conform gradually to measures of general standardization of ways, plant and equipment, including methods of electrical operation, type, frequency and pressure of current. It is tolerably plain that on this matter of standardization no serious difficulties are likely to arise.

GOVERNMENT GUARANTEE OF CAPITAL

The public discussion of the extension of electrification was stimulated in November last by the passing of the trade facilities act. This is one of a series of acts rushed through Parliament in October for the purpose of reducing unemployment, now so rife. The part of the trade facilities act which has a bearing on railway electrification is the first section which states that if the Treasury, after consultation with an advisory committee (nominated for the purpose), is satisfied that the proceeds of any loan proposed to be raised are to be applied toward the carrying out of any capital undertaking, and that the application of the loan is calculated to promote employment in the United Kingdom, the Treasury may guarantee the payment of the interest and principal or of either interest or principal on the loan. It is also provided that the aggregate amount of the loans to be guaranteed is not to exceed £25,000,000. There is no power to make advances or grants. The object in view is, of course, to enable companies, local authorities and others to obtain a lower interest rate.

It was stated by the government when the act was before Parliament that the electrification of railways would come within its scope. Soon afterward several English railway companies which have had conversion to electric traction in view for some years allowed particulars of their schemes to be published. Some of these were new to the public, while others were already well known. At the time of writing the two schemes which appear most immediate are those of the London, Brighton & South Coast Railway and the London underground electric railways extensions. The latter will be dealt with later. Meantime, it may be said that if applications were made for guarantees by all the railway companies which contemplate electrification the sum of £25,000,000 would be wholly inadequate. This is apart from the fact that all sorts of other schemes unconnected with railways are eligible for guarantee. The advisory committee, which is composed of financial experts, has received a very large number of applications, and much examination and weeding out will be required.

THE ELECTRIFICATION SCHEMES GIVEN IN DETAIL

The proposals which have been made public, but for only a few of which (so far as is known) have applications for guarantee been made, may be briefly indicated. The main reasons for the proposals are that they would increase the capacity of congested railways, reduce the time of running and produce economical operation. The London, Brighton & South Coast Railway, which already works some of its suburban lines electrically on the single-phase high-tension system, possesses Parliamentary powers to electrify the remainder of its undertaking, including the main line to Brighton. Work on some of the suburban lines was stopped by the war, and the work is expected to be finished during 1922. When the whole scheme is carried out more than 100 miles of route will be electrified. A handsome return on the additional capital is estimated. The railway company has just given official notice of its intention to promote a bill in the coming session of parliament to authorize it "for the general purposes of its undertaking (including equipment of its railways for electrical traction)" to raise additional capital by mortgages or debentures. It is also learned that toward the end of the past year the company made an application under the trade facilities act for a government guarantee on the loan proposed to be raised for the purpose of electrification. All the plans are ready, so that the company could go ahead at once. The single-phase system will be used throughout, the company having been specially exempted by the committee on electrification, already referred to, from the proposed direct-current standardization.

Particulars are now available of a scheme which has been in existence for two years or more for the electrification of all the lines of the South Eastern & Chatham Railway within a radius of 30 miles from London. This means about 140 route-miles. As in other cases the multiple-unit system will be employed for local suburban trains and electric locomotives for those traveling over the longer distances. Direct-current traction at 1,500 volts will be used. Parliamentary powers have not yet been obtained.

Of all the main lines leading out of London, the Great Eastern Railway has the largest suburban traffic. Extraordinary ingenuity and resource have been displayed to improve the working capacity of the Liverpool Street terminus under steam traction. Electrification has been under consideration for years, but initial capital expenditure has been a bar. No fresh step is announced, but it is the fact that electrification is probably more needed to meet congestion on the company's suburban lines than on any other system leading out of London. It appears that Parliamentary powers for electrification are at present awaiting and will have to be sought.

Other schemes which are still awaiting development and in regard to which nothing immediate is promised are the London & South Western Railway extension of electric traction involving 45 miles of route, the construction of the Wimbledon and Sutton authorized electric railway, the authorized electrification of the London and Southend section of the Midland Railway (about 40 miles of route) and the conversion to electric traction of the main line of the North Eastern Railway from York to Newcastle, and Northallerton to Stockton on Tees loop, in all 110 miles long.

LONDON UNDERGROUND RAILWAYS

With an admirable promptitude Lord Ashfield, chairman of the associated London underground railway companies, as soon as the applicability of the trade facilities act became known, presented a scheme to the government for carrying out the long projected improvements and extensions of the underground system. All these developments already have parliamentary authority, so that no delay would arise in seeking powers. His Lordship sought the government guarantee of interest on new capital which would then be advantageously raised in the city of London. The proposed works, estimated to cost £6,000,000, include the enlargement of the tunnels of the City & South London Railway so as to permit through running with the Charing Cross & Hampstead line and more comfort for passengers by means of more commodious cars, the construction of the Hampstead & Edgmore Railway as a surface extension of the "tube" line, and various short connecting and linking up lines. The application for guarantee was, however, accompanied by a condition that the government should pass legislation in Parliament to give the London General Omnibus Company a monopoly of omnibus street traffic in London for ten years, so that the bus company's revenues might help the underground railways (both being in a common pool) if necessary in maintaining dividends. The government promptly refused to introduce any such legislation, whereupon Lord Ashfield announced that he would try to devise a new scheme which might prove more acceptable.

In connection with government guarantees of interest on capital and the subject of fares, the position of the London underground railways is interesting and peculiar. Under the defense of realm acts (passed during the war and now expired), the ministry of transport act, 1919, and the railways act, 1921, extensive powers were given to the government (and in particular to the Ministry of Transport when it was constituted) to deal arbitrarily and drastically with long established railway arrangements. Under these powers the government, among other things, made great increases in the rates chargeable for freight and in passenger fares. The latter, from railway time immemorial, were limited to a maximum of a penny per mile for third class. In view of the great increase in costs the government raised this maximum to 1¾d. per mile. With the exception of the Metropolitan District Railway, the roads in the underground group were not affected, as they had not been taken under government control. Later, the District Railway was also freed from the control, but all roads in the group were allowed to increase their fares in the hope that that would enable them to meet working expenses. The fares have remained on the higher level ever since, but the level except for the shorter journeys is considerably below that of the steam railways of the country.

In regard to the general system of railways in Britain, it is laid down in section 58 of the railways act, 1921, that the charges to be fixed (by the rates tribunal constituted under the act) are to be such as will yield, with efficient and economical working and management, an annual net revenue (called the standard revenue) equal to the revenue of the year 1913, together with revenue to meet capital expenditure since that date. The arrangement is to be reviewed periodically. Thus the whole old penny a mile maximum is swept away, as are also the old rates for freight.

These conditions, however, do not apply to the London underground railways nor to the Metropolitan Railway, which runs 40 or 50 miles into the country. These have not been included in any of the great groups, the idea being that they may ultimately be formed into a group by themselves. So far as a layman, as distinguished from a lawyer, can see, the London underground railways are free from government compulsion as to what fares they may charge. Of course if they get a government guarantee of interest on new capital, conditions might be attached to it. In any case, if unduly high fares were ever charged, these would have to be equaled by the associated London General Omnibus Company, while the latter over a very large area has the competition of the London County Council municipal tramways. Moreover, any increase in fares on the underground railways, even if reasonable and shown to be necessary, raises howls of execration in the London evening newspapers. Further, any attempt by the underground railways to "exploit" London would be followed by government action.

UNDERGROUND A PHILANTHROPIC INSTITUTION

Apart from all these safeguards, the management of the underground railways has always gone on the policy of charging the lowest possible fares and of developing the traffic accordingly. No question has arisen, or is likely ever to arise, of the companies making excessive profits. The cost of construction of these lines, both for land and works, was so high that nothing beyond meager dividends can be looked for. The ordinary stock of the District Railway never gets any dividends; the highest that I can remember was 4 per cent on the Central London Railway stock. Very often in other cases one sees dividends of 1 per cent announced or less —sometimes nothing at all. In reality the whole concern is a sort of philanthropic institution for Londoners. The original capital was subscribed in a period of high hopes; as a result the capital cost proved so large and the net revenues so low (in spite of overwhelming passenger traffic) that any "dreams of avarice" must have been keenly disappointed.

Joint committees, representative of employers and employed, are being constituted to deal with questions of wages and conditions of employment on the London underground electric railways. Similar committees already exist in connection with the main steam railway undertakings of the country, but as the underground railways have been left out of the grouping scheme for other railways, they have to act independently. The scheme provides for the formation of sectional committees, departmental councils, an underground council and a negotiating committee. The sectional committees will provide a reorganized means for the discussion and settlement between the employees and the local officials of questions arising out of the employment. The departmental councils will effect similar services on matters which concern two or more sectional committees, while the underground railway council will deal with subjects affecting two or more departmental councils. The negotiating committee will deal with any alteration of any agreement between companies and trade unions and will confirm such alterations before they become operative. No withdrawal of labor or interference with efficient operation is to take place until the cause of the dispute has been dealt with under the machinery provided and a settlement has not been reached within twenty-eight days after reference to the negotiating committee.

TRAMWAY SITUATION

The present stagnation in tramway extension in this country is illustrated by the fact that in the 1922 session of Parliament only two bills will be promoted to authorize the construction of tramways. There does not seem to be any prospect of improvement till costs of construction have fallen materially. Meantime possible extensions are being worked by motor buses. The main exception to the general discouragement is to be found in Glasgow.

For a long time it has been recognized that the Glasgow Town Council is one of the most enterprising, not to say aggressive, municipal corporations in Britain. Fresh proofs of the energy and expansion, including schemes extending far beyond the city boundaries, are now forthcoming. One of these, for running omnibuses within and outside the city, will be dealt with in an early issue of BUS TRANSPORTATION. Parliamentary powers are also being sought for the construction of several additional tramways and tramroads of considerable length. No doubt it is thought that by the time the work of construction can begin the cost of labor and materials will have fallen substantially.

Another proposal is to take over two existing tramway systems in the neighborhood of Glasgow. First, it is sought to acquire from the Airdrie & Coatbridge Tramway Company the lines in these towns and work them as part of the Glasgow system. These routes cover 2.32 miles of single track and 1.31 of double. The price, which is provided for under an existing tramway order, is £82,250. The other kindred proposal is to offer £200,000 to the Paisley & District Tramway Company for its undertaking, over which at present the Corporation has running powers. The undertaking consists of 14.41 miles of double track and 3.84 miles of single. If these schemes are carried out, continuous tramway communication east and west through Glasgow under one authority will be provided for many miles through an area which for the most part is densely populated, and which includes great centers of industry. There are only two other tramway systems in the vicinity of Glasgow worked by companies, namely the Lanarkshire and the Dumbartonshire.

Largely for the purpose of relieving tramway congestion in the center of the city, Glasgow Town Council has decided to proceed with the erection of an additional bridge across the River Clyde, at Oswald Street, a short distance to the west of the present Jamaica Bridge. The new bridge, which may cost £500,000, will of course carry tramways. The project has been talked about from time to time for several years, and one of the reasons urged for further delay was that two or three years hence the bridge could be built more cheaply than at present, as prices are bound to fall. Members of the Council specially interested in street traffic were, however, urgent in expressing the need for relieving the congestion on Jamaica Bridge and its approaches. It may of course be some little time before contracts are let and the work actually begun.

The Guaranteed Week

A conference of representatives of British municipal tramways was held in London on Dec. 9 to consider a position which had arisen in the National Joint Council for the tramway industry. Under an agreement reached in March, 1919, tramway employees were guaranteed pay for forty-eight hours a week, even though men employed on part-time cars might work much less time. The arrangement has been found impracticable, because it could not be varied to suit varying local conditions and because it hampered the increase of services during the rush hours. The employers' representatives on the Joint Council sought to have this provision of the agreement revised, but the workmen's representatives refused. At a meeting of the Joint Council in London on Dec. 15, it was unanimously agreed to appoint a joint sub-committee consisting of seven representatives of employers and seven of workers to revise the whole of the terms of the tramway agreement of March, 1919, without binding the Conucil to adhere to the guaranteed forty-eight-hour-week. The question of the guaranteed week remains the bone of contention. The sub-committee is expected to report to the Council in February.

London Tramway Fares

London County Council has now modified the very high fares on its tramways which came into force about a year ago. The results were not all that were expected. Comparative figures for the twelve weeks ended Sept. 28 last and the corresponding twelve weeks of 1920 (which immediately preceded the last increase of fares) showed that passengers had decreased by 11,416,050, while revenue had increased by £147,109. The decreases applied both to passengers and revenue for the short journeys, there being increases in both for the long distances. The highway committee of the Council considered this meant that people were walking the short distances instead of using the cars. To regain the lost traffic, the general manager suggested that the penny fare stage should be increased from 0.6 of a mile to 1.2 miles, that the 1½d. fare should be abolished, and that 2.4 miles should be given for 2d. and 3.6 miles for 3d. It would not be necessary to change the higher fares. The manager anticipated that, while the change would produce a temporary fall in receipts, the revenue would at least recover to the present level by the end of the financial year in May next. In view of savings in expenditure now likely to be effected, he thought the estimate that the financial year would show a slight surplus on working would still be realized. The highway committee supported these proposals, which briefly means adding 0.6 of a mile to the 1d., 2d. and 3d. stages. At the meeting of the County Council on Nov. 15, when the recommendations were submitted and agreed to, Mr. Squires, chairman of the highways committee, described the step as a big experiment, the suggestion for which really emanated from the tramway management, who were practically staking their reputation on its being a success. The reduced fares came into operation on Dec. 1.

In a report to Edinburgh Town Council on the electrification of the cable tramways in the city, R. S. Pilcher, the tramway manager, says that the working expenses per car-mile of the electric tramways in Leith (adjoining Edinburgh) are 15.4d., while the figure for the cable tramways in Edinburgh is 19.63. The difference on the mileage run by the cable cars is equal to £98,000 per annum. This would much more than meet the annual capital charges on the cost of conversion. The total estimated cost of conversion is put at £648,711. Contracts for part of the work have already been let. In regard to Mr. Pilcher's figures of working expenses, it may be noted that the cable system is old, and has been allowed to run down considerably. In past years it used to work very economically.

Nothing Like This in America

LONDONERS are not exactly proud of the dense fog which occasionally descends on the metropolis, says the *Tramway and Railway World*, but though these visitations seriously retard the coming and going of the people, they regard them with a kind of indulgent interest as being of a brand peculiar to London. Not so with the drivers of tramcars, buses and other motor vehicles, who experienced during the four or five days at the end of November a very trying and anxious time. To any one who has not seen a real London fog the appearance, or rather the disappearance, of the street is hardly conceivable. It is practically impossible for any-one to see but a few yards ahead and the fog even resists the penetration of powerful lights.

During the week end of Nov. 22 and 27, the density of the fog which visited London literally disorganized traffic and reduced the otherwise busy thoroughfares to a state bordering on chaos. So bad did conditions become that acetylene flares were lighted at some of the principal crossings to guide vehicular and pedestrian traffic. On the evenings of those two days bus service was gradually prevented owing to the extreme slowness of progress and the risk involved. In some districts where the fog was particularly opaque buses were equipped with extra lamps casting rays sideways and downward to enable the driver to see the curb. During all this time but one or two minor collisions occurred.

W. P. G. Harding, governor of the Federal Reserve Board, in a recent public address, referred to tax-free securities as follows:

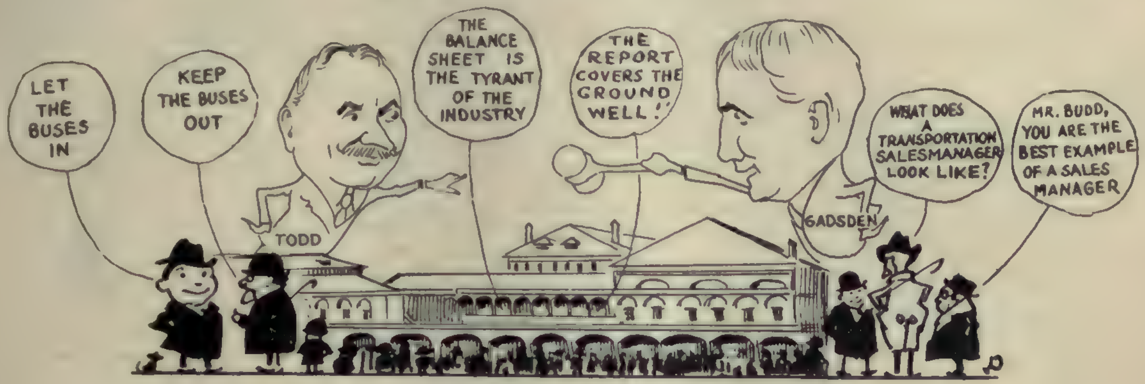
> Taxation can be escaped altogether or in part by investing in state and municipal bonds, which are exempt from the income tax, and the ability of municipalities to sell their obligations more readily because of this fact has had a tendency to increase the volume of their indebtedness. Consequently local taxation has increased materially, and unless the issue of tax-exempt obligations is checked the utimate results are likely to be serious.

The notion is a mistaken one that the best thing about the year 1921 is that it is a thing of the past

Facts of 1921 "Fictionized"

By G. J. Mac Murray

News Editor "Electric Railway Journal"


LET THE BUSES IN
KEEP THE BUSES OUT
THE BALANCE SHEET IS THE TYRANT OF THE INDUSTRY
THE REPORT COVERS THE GROUND WELL!
WHAT DOES A TRANSPORTATION SALESMANAGER LOOK LIKE?
MR. BUDD, YOU ARE THE BEST EXAMPLE OF A SALES MANAGER
TODD
GADSDEN

"The crowning event of the year was, of course, the convention at Atlantic City in October"

THE STRANGER in Boston starts on a journey to a point in any direction and after meandering around from ten minutes to ten hours arrives at the place from which he started. The difference between the stranger in Boston and the writer is that starting early last January and by depending on his memory and by turning 2,358 pages of the files for the year in an effort to review some of the outstanding happenings of 1921 in the industry he has arrived at practically the same place at which he began. Of course, it isn't quite as bad as that. The statement should be taken metaphorically, not literally.

Elsewhere in this issue the statisticians who play with the figures prove that things in the electric railway industry are a whole lot better than they were a year ago. At least they said that was what they were going to prove. When a statistician starts to prove anything he usually succeeds, for statistics are like hash, you can put almost anything into them. If your mind runs to figures then consult the tables. If you do consult the tables you will find that only one large company went into the hands of receivers in 1921. Here some pessimist will arise to inject the statement that anyway there were only a few large roads left that could do so. Of course, even the Interborough would have been, too, only Mr. Hedley and others celebrated New Year's Eve of 1921 by scraping together $1,000,000, or was it $100,000,000?

It is only proper to start the new year on New Year's eve, but the world knew nothing about the New Year's eve party of Dec. 31, 1921, in New York until the Public Service Commission brought out the fact late in November that by the grace of somebody or other people ride in the subway in New York with Mr. Hedley as general manager instead of with him as receiver. With the Interborough saved, it is, of course, possible to go back and start at the beginning again.

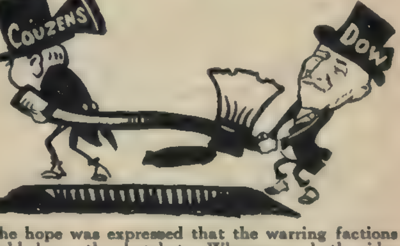
"The remark 'God bless Stone & Webster' won a prize of $100 for a resident of Seattle who suggested that the best way to settle the problem of the municipal railway would be to beg Stone & Webster, the former owners, to take the road back"

The traction situations in New Orleans, St. Louis, Seattle and in various other places remain for the most part unchanged, but steady progress has been made in Pittsburgh, Albany, Toledo and in other cities. Paul Maloney in New Orleans is still questioning every move made by the local company, but the people there are showing signs of weariness. There will be an election in New Orleans before long and the residents may say it with votes. In which case Mr. Maloney will probably be like Eamon de Valera: he will have lots of fight left, but nobody with whom to pick a quarrel.

"The portly Mr. Weatherwax has drawn Mr. Mahon over the ropes and now eleven months after the battle started the Amalgamated has admitted defeat and cried, 'Enough!'"

In Pittsburgh they have returned to office former Mayor Magee. He was elected just after the first vote had been taken on the new franchise settlement there, but he injected himself into the traction matter either to claim some of the credit for what has been or to exempt himself from responsibility. All the Pittsburgh Railways has to do now is to raise $5,000,000. But speaking of elections, one never can tell what will happen. Take New York, where Mr. Hylan was re-elected on a 5-cent fare, although most of the surface car riders, particularly those in Brooklyn, are paying 10 and 15 cents where they formerly paid 5, and millions of transfers have been cut off. Or take Youngstown, where they elected Mr. Oles as Mayor. Mr. Oles, according to his platform, favors the jitney. But Mr. Oles appears to be out of luck. The local railway there is selling a pass at $1.25 a week, which gives unlimited rides, while jitneys are or were charging 10 cents straight. Mr. Oles took office on Jan. 1. At the time this review was written the prospects were that the pass would put the jitney completely out of business. Thus Mr. Oles is cheated before he begins. The local Youngstown company has taken the electric railway out of politics.

The idea behind this summary was of course to start out in January, 1921, and carry the reader along chronologically. With that in mind for the moment it becomes necessary to start over. An effort will be made to stick to the historical order, but no promise is implied. Early in January the local Amalgamated at Albany



"The hope was expressed that the warring factions would bury the hatchet. Whereupon both sides proclaimed that it had been the other side which had been wielding the deadly weapon. . . . But everything is lovely in Detroit now, with the great pacificator Mr. Dow in the saddle"

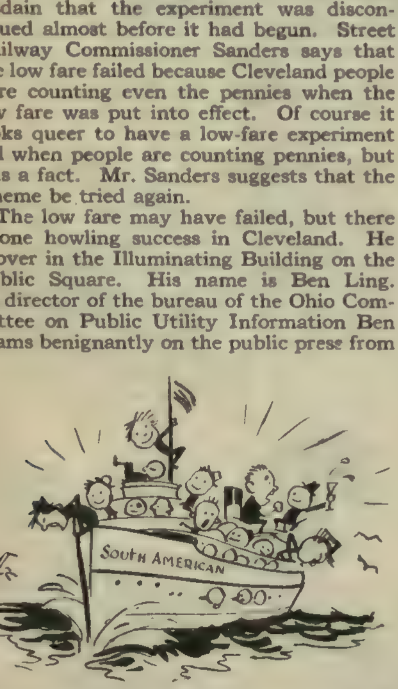
"Mr. Cann contemplates purchasing fifty one-man cars with which he confidently hopes to chase the jitneys off the streets"

decided to go on strike. In other words, Mr. Mahon concluded to come to grips with Mr. Weatherwax. In this tug of war the portly Mr. Weatherwax has drawn Mr. Mahon over the ropes and now eleven months after the battle started the Amalgamated has admitted defeat and cried "Enough!" Of course it was hard on Mr. Weatherwax and the United Traction Company, but in localizing the scrap a lot of other companies saved money and the Amalgamated came to its senses. No other strikes of importance were called during the year.

Out in Seattle they are still at it. In fact it has become "Seattle the Sensational." Mr. Witt says Seattle needs to spend $2,000,000 on its municipal railway. The Mayor regards this as a witless recommendation. "There it is," says Peter. "Take it or leave it." "I have other business in Cleveland." On the other hand, the remark "God bless Stone & Webster" won a prize of $100 for a resident of Seattle who suggested that the best way to settle the problem of the municipal railway would be to beg Stone & Webster, the former owners, to take the road back. As Solomon said: "There's a time to weep and a time to laugh."

It is not Seattle but Mr. Witt that calls to mind the Cleveland low-fare experiment and Ben Ling and a lot of other things. The people of Cleveland apparently were not interested in the 2½-cent fare in the business district. Anyhow, they treated it with such disdain that the experiment was discontinued almost before it had begun. Street Railway Commissioner Sanders says that the low fare failed because Cleveland people were counting even the pennies when the low fare was put into effect. Of course it looks queer to have a low-fare experiment fail when people are counting pennies, but it is a fact. Mr. Sanders suggests that the scheme be tried again.

The low fare may have failed, but there is one howling success in Cleveland. He is over in the Illuminating Building on the Public Square. His name is Ben Ling. As director of the bureau of the Ohio Committee on Public Utility Information Ben beams benignantly on the public press from Cincinnati to the Great Lakes. Ben's bureau for the dissemination of news is only one of many similar bureaus, but he has been eminently successful. Ben's story is best told in figures. There is no other way to tell some stories. He has to his credit 2,500 solid newspaper columns in one year, all to the lasting benefit of the industry, to say nothing of the editorials which he provoked. For the industry as a whole Labert St. Clair during the past year scored heavily with his historical review of the thirty-fifth anniversary of the industry and with his book "Getting the Public Eye and Ear."



"There seemed to be unanimous agreement that it was the best meeting the association ever had' and 'many began before it ended to plan for a similar outing next year! You can't blame them, can you, with the refill station just across the river?"

Oh, yes, in the great hurry the Detroit election must not be overlooked. They returned Mayor Couzens to office there. In an editorial in the *Electric Railway Journal* just before mutual running rights were arranged between the Detroit United Railway and the Municipal Railway the hope was expressed that the warring factions would bury the hatchet. Whereupon both sides proclaimed that it had been the other side which had been wielding the deadly weapon. It was a gentle battle in Detroit while it lasted, with Mr. Burdick of the Detroit United Railway spirited off to Belle Isle and imprisoned overnight while an army of process servers accompanied by Pinkerton men sought the portly Mr. Goodwin of the municipal railway with writs and other legal documents. But everything is lovely in Detroit now, with the great pacificator Mr. Dow in the saddle.

Before the storm broke in Detroit some of the Detroit United Railway men sought less strenuous fields of endeavor. Thus Mr. Cann has found repose in the office of street railway director at Toledo, Mr. Rifenberick is at Baltimore and Mr. McIntire is at Mobile. At Toledo Mr. Cann has worked well with the genial Frank R. Coates, in charge of the Toledo Railway. It appeared at one time as if there would be no people left in Toledo for Mr. Coates to carry on his cars or for Mr. Cann to record. But things are better there now. In fact, they have become so encouraging that Mr. Cann contemplates purchasing fifty one-man cars, with which he confidently hopes to chase the jitneys off the streets.

"Des Moines, after flirting with the jitneys, went back to its old love"

The crowning event of the year was, of course, the convention at Atlantic City in October. At that meeting Edwin Gruhl, speaking about "The Traction Industry Today and Four Years Ago," covered about everything worth while. In referring to the Federal Electric Railways Commission, which went the same way as the fourteen points and with no more terrible consequences, Mr. Gruhl said: "The patient has been in a worse way since the commission voted its condition as acute, but it has met the crisis and is now on the road to convalescence." It was and is, if you get what is meant. If you don't then turn back to Mr. Frothingham's paper, "The Basis of Financial Recuperation." As former Vice-President Marshall would say, "You said it." Mr. Frothingham was both lucid and logical. As a parting shot he said: "Credit cannot be re-established without earning capacity, and earning capacity cannot be achieved in the face of public distrust and opposition, the hydra-headed enemy of the industry." So far so good. But if you would dispel distrust and emulate St. George consult Mr. Goodwin of advertising fame, another speaker at the Atlantic City convention, for the weapons with which to slay the dragon that blocks the path.

The last speech is always the best, and the most convincing. This is the reason bus companies were not admitted to membership in the American Electric Railway Association, although the Amalgamated Association had previously welcomed bus operators with open arms. As an abstract proposition the convention was in favor of such acceptance, but it went on record as considering such action inadvisable at the present time. Just as the crowning event of the year was the convention, so the crowning glory of the convention was, of course the election to the presidency of the genial Robert I. Todd, a Hoosier by adoption with a national reputation for his chicken dinners.

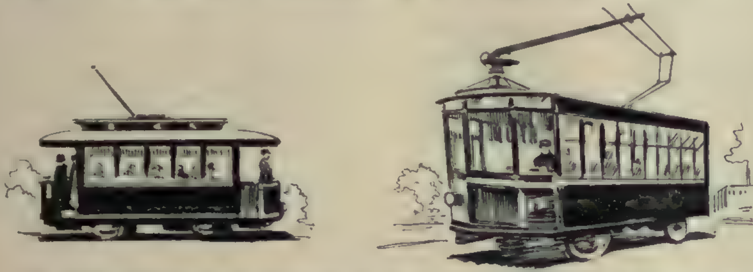
"But Tom (Mitten) is too busy Kissing the Kids at the picnic of his employees . . . . to mind the croakers"

Next in importance to the Atlantic City convention was the mid-year meeting in Chicago in February. Chicagoans are very much the same as other people, but every time a meeting is held there calling for attendance from people from out of town it appears to be necessary to justify the selection of the convention site. This the editor of the *Electric Railway Journal* also felt it incumbent upon him to do, for in the leading editorial in the issue of the paper recording the convention proceedings he completes his justification with the statement, "The mid-year meeting of 1921 has passed into history." After a thing happens it always passes into history. A bromide you say. Not so fast. Doubtless the editor knew what he was doing in coupling the sentiments of dread and satisfaction about Chicago, but the connection is not plain at this distant date. There was so much to praise and so much to say commendatory of that meeting that it is best to repeat for the benefit of those with short memories that the topic was "Finance" and let it go at that. The editor, having heard at the banquet, Mr. Leedy, the humorist of the Youngstown *Telegram*, evidently thought that he too had to try to be funny at the expense of Chicago. No such obligation rests on the writer of this review.

The third most significant meeting of the year was the C.E.R.A. boat trip. The whole story of that trip was told in the subhead to the account in the *Journal* at that time. An annual prize is awarded to the editor who writes the best subhead to any story which appears during the year. The one on this account does the trick so well that it leaves nothing else to be said now. The writer of it should get the bacon. There appears no reason to doubt the assertion of the historian of the meeting to the effect that "there seemed to be unanimous agreement that it was the best meeting the association ever had" and that "many began before it ended to plan for a similar outing next year." You can't blame them, can you, with the refill station just across the river? The summer meeting of the C.E.R.A. is certainly something to look forward to and also something to remember.

Almost the last thing mentioned in the reference to the Atlantic City convention a few paragraphs ahead was the jitney. The principal jitney cities this year have been Des Moines, Kansas City, Saginaw, Battle Creek, Muskegon and Newark. It has been a running fight in all of them all year. Kansas City and Saginaw are apparently still not out of the wilderness, but in Des Moines and other cities the issue has been settled. Actors on the vaudeville stage are inured to all kinds of hardships, but Des Moines under the jitneys was too much for them and became to them Death Moines. All over the central west jokes about Death Moines were cracked on the stage by the vaudevillians. And right here let it be said as history that residents of Fall River, Mass., ride for 5 cents, while the residents of Gloucester, also in that state, who chose the bus instead of the electric railway, hang on in buses and pay 10 cents.

Having dashed East from Des Moines to Massachusetts, it might be well to stick around for a while in the neighborhood of Plymouth Rock. Early in the year the debonair Matt Brush breezed into Boston with a dozen or so of his pet pocket elephants and hung the sign of the Khedive, or whatever other ruler governs the land where elephants are found, so effectively on the legislative investigating commission that the inquiry promptly broke up. Matt succeeded where others had failed — just as he always does. All the while Edward Dana, Mr. Brush's successor on the Boston Elevated, has been struggling with the problem of the accumulated deficit of the Boston "L." This he has cut down a little and is showing black instead of red in his operating statements. Also he has added considerably to the number of 5-cent lines in the suburbs.



"The pioneer trackless trolley installation was made at Richmond, Va., early in the year. This of course, put Richmond on the map solidly as the electric propulsion pioneer, for just thirty-five years ago the first successful trolley line in the United States was installed there"

This activity by Mr. Dana in putting in 5-cent lines got him into trouble, for overemphasis by others of the 5-cent experiment made it necessary for Mr. Dana to appear in the New Jersey fare case and set the record straight there. In New Jersey they are charging an 8-cent fare on the lines run by Tom, Dick and Harry, otherwise known respectively as Messrs. McCarter, Danforth and Donecker. And having secured an 8-cent fare the company turned around and sold several million dollars of 8 per cent preferred stock to its patrons. Off by himself in the southern end of the state, at Camden, Martin Schreiber is encountered putting into practice with great success the plans for management and men outlined by him at the convention at Atlantic City a year ago last fall.

And speaking of management and men, who has done better than Mr. Mitten in Philadelphia, right opposite Camden, or is Camden opposite Philadelphia? No matter. At the mention of Mr. Mitten's name, the Anvil Chorus will commence. But Tom is too busy kissing the kids at the picnic of his employees, or driving a hard bargain for the operation of the Frankford "L," built but standing idle, or exchanging notes with Transit Director Twining or giving away his surplus personal funds, to mind the croakers. Tom is like Eva Tanguay. He has now got to the point where he doesn't care, even if he ever did.

In Chicago the peculiar situation was presented of the authority of the Public Service Commission to raise rates under an order from the State Supreme Court being upheld by the United States Supreme Court only to have the Illinois Commerce Commission, the successor to the Public Service Commission, order fares on the surface lines reduced to 5 cents. As a political move this action by the commission was a good storke. If only the theoretical savings in operating expenses worked out as possible by the commission could be realized it would indeed be a very happy New Year in the Windy City.

Speaking about economies and success in overcoming obstacles, it seems that L. S. Storrs, president of the Connecticut Company, deserves honorable mention. Not by any means has Mr. Storrs surmounted all the difficulties with which he has been beset, but he is steadily ascending the heights, so much so that from Hartford came the statement recently that based on a review of the data on file with the State Utilities Commission the Connecticut Company appears to be one of the first properties of its kind in the country to begin to come back. Moreover, Mr. Storrs was the author of the notable article "Our National Fare Experiments," published in the *Journal* for Jan. 1, 1921. That Mr. Storrs knew what he was writing about is evidenced by the record which his property has since made.

But it is getting very tiresome, this chasing around from one city to another and covering hundreds of miles in that many seconds. Suppose for a change some particular subject is taken up. Service-at-cost franchises seem to be about as fitting as anything else at this point. Mr. Nash, as an analyst, said about all there was to be said on that subject at the time he wrote last January. Reference to service at cost recalls of course the original service-at-cost city, Cleveland. Extensions and improvements are needed in Cleveland, and another year the matter of financing them may be solved. If money rates continue to come down the question will probably be settled automatically by it being made possible for the company to sell securities under the terms fixed in the original grant. If not, then the Council may come to its senses. Street Railway Commissioner Sanders there thinks that on the whole the grant has stood the test admirably. Toledo started under service at cost at an inauspicious time. Depression in the auto business hit Toledo especially hard, but the situation there is improving. The situation de luxe under service at cost is at Montreal. There the company has begun to pay off the accumulated dividends on the common stock and the outlook has gradually become so auspicious that a recent quotation for

"Bill Boyce even called pictures by Charlie Chaplin to his aid in inducing traffic on his lines"

that issue was $140 a share, or thereabouts. Rights are even anticipated. Yes, rights! You see, a great many Americans have pressing business in Montreal these days. Didn't the New England Street Railway men even go there to hold a meeting? They can't confiscate your automobile because you happen to have a full belly.

Who shall decide, when doctors disagree,
And soundest causists doubt, like you and me?

These words of Pope call to mind the so-called battle of the systems of years ago with its present parallel in the controversy over the superpower survey report. With Mr. Murray and the *Railway Age* debating in heated terms such topics as coal consumption, or its equivalent, in steam locomotives and in power plants furnishing electric power to electric locomotives, the relative cost of maintaining steam and electric locomotives, etc., what must steam railroad men think who contemplate electrification? The matter can not be decided with the aid of the dictionary and invective. The combatants seem to have lost sight of the admonition:

"Act well your part, there all the honor lies!"

Going back to the geography again two very notable meetings were held in the South, both at Atlanta. One was the Amalgamated Association session; the other was the meeting of the National Association of Railway Commissioners. While ex-Governor Brown of Georgia rained invective upon Mr. Gompers and Mr. Mahon and challenged them repeatedly they ignored the communication. Mr. Gompers had a very wonderful debate with Governor Allen of Kansas some time back which he is not likely soon to forget, and has become increasingly more careful. As for the utility commissioners, they went formally on record against government ownership. It was a costly experiment, the operation of the railroads during the war by the government, but it seems to have been worth the price. Mr. McAdoo doesn't think that it proved much, but there are a lot of people who don't agree with Mr. Mc Adoo.

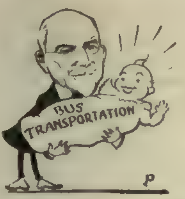
In the first issue of the *Journal* for 1921 the statement was made in an editorial that constructive legislation should be a feature of 1921. Some forty Legislatures out of the forty-eight met. The legislators heeded the advice given. The most notable examples were indeed in Connecticut and New York. In Connecticut the railway of that name was relieved of paving, bridge and other charges and was granted an extension of time in which to make up back

"Bill Boyce chasing after the dollars"

payment then accumulated. In New York the complete reorganization of the commissions was brought about under the plan started on its way for the present New York inquiry. In Illinois the home rule and the 5-cent fare bills were defeated.

As for interviews during the year among the most notable were "Ask the Car Rider" and "Railways' Financial Cycle Has Come." Both of these were written by Bozell, the Boswell to the leaders in the industry. If you don't want to be interviewed be careful how you talk to him. He has a habit of expanding 500 words into 5,000 and then coming around to you with proof of an interview and a portrait in which you are shown seated at your desk reading—of course, of course, the news pages of the *Electric Railway Journal*. Other notable achievements of the interview type were the articles early in the year by members of the Federal Electric Railways Commission.

The pioneer trackless trolley installation was made at Richmond, Va., early in the year. This of course put Richmond on the map solidly as the electric propulsion pioneer, for just thirty-four years ago the first successful trolley line in the United States was started there. Pilgrims from all over the United States gravitated to Richmond to watch the new mode of transport in operation. Among them was a representative of Mayor Hylan of New York and as a result a trackless trolley was later installed on Staten Island to be run and managed by the city. The line was opened just before the fall election in New York city and the ceremonies in connection with it were made the occasion for furthering the political ambitions of the Mayor and his cohorts.



"A New Baby in the McGraw-Hill Family"

Selling transportation was the subject of the issue of Sept. 24, but it did not by any means contain all the worth-while things on that subject. There was the notable series by William H. Boyce, who is the William S. Hart of this business. Bill Boyce, in chasing after the dollars, even called pictures by Charlie Chaplin to his aid in inducing traffic on his lines. Some day Bill will actually install a moving picture machine on his cars as an inducement to secure riders. Another notable event in connection with the work of selling a road to its patrons was the exhibit of the Chicago Elevated Lines at the pageant in that city. The weekly pass sold the roads in Youngstown and Kenosha to the patrons there.

The most notable valuation cases of the year were of course those involving the properties of the Public Service Railway of New Jersey, the Connecticut Company and the New Orleans Railway & Light Company.

As for the *Electric Railway Journal*, the year was momentous in that the decision was made to establish *Bus Transportation* in the interests of co-ordinated passenger transportation service. The reasons for this decision have been given at length. The new paper is the most powerful editorial that ever appeared in the *Electric Railway Journal*.

Thus the reader sees compressed into less than four pages of type an outline of outstanding events which kept a staff of twelve editors busy for a whole year. If you begin to wonder what all these editors do with their time you share with the writer something that is a source of amazement to him and of constant concern to the company executives.

Demand Rate Charge Applied to Fares

A Passenger by Buying a Commutation Ticket for 50 Cents a Month Can Reduce His Fare 50 per Cent—System Works Well in Muscatine and Mason City

IN TWO articles published in the ELECTRIC RAILWAY JOURNAL during 1919 (April 5 and April 19) Richard Schaddelee, vice-president United Light & Railway Company of Grand Rapids, outlined a plan for railway fares which would give the frequent rider a merited advantage over the casual rider in the payment which he was called upon to make for the service. In one of these articles Mr. Schaddelee said among other things:

"The inherent injustice and inequity of any straight fare schedule is that it charges the same fare to all passengers, regardless of the distance they ride and regardless of the number of times they ride per year or month. There has been some deviation from a straight fare basis by the sale of six tickets for a quarter, etc., but these deviations have been few and have not removed the inherent injustice of the straight fare schedule. Theoretically and as a matter of equity and justice, the prices charged for street car service should be based upon two factors, viz.: First, the distance that the passenger rides, and, second, the number of times a passenger rides per year or per month. The unfairness of charging a passenger the same fare for riding half a mile as for riding from 5 to 8 miles is readily appreciated and understood by every one. For that reason there has always been much earnest discussion in regard to ways and means to eliminate this injustice, or at least reduce it, and as a result we have the zone system.

"It is not my purpose to discuss this injustice of the fixed fare in connection with the distance of the ride, as this injustice cannot be solved apparently without the zone system, with its undesirable results in causing a congestion of population. The much greater injustice to my mind is the injustice of the fixed fare as applied to a passenger who uses the street car service, say, five or ten times per month and the passenger who uses it from forty to a hundred times a month."

As a basis for overcoming this injustice, Mr. Schaddelee suggested the sale to passengers of a commutation ticket for, say, $6 a year or 50 cents a month by which he would be entitled to ride at reduced rates as often as he desired during the period in which the ticket was in force. Mr. Schaddelee suggested in the article referred to that the fare to the passenger not holding one of these cards should be 10 cents and the fare to a ticket holder should be 5 cents. This plan, it will be noticed, differs quite radically from the plan of a straight fare used at Youngstown, Racine, and other places. The charge for the card is considerably less, but the passenger pays some fare when he gets on the car.

COMMUTATION TICKET ON MUSCATINE CITY LINES

Results for month of November, 1921, of demand form of street railway fare as compared with flat fare of 7 cents in force during month of October, 1921.

Fare Rates			
Single fare without ticket		10 cents	
Monthly commutation ticket cost		50 cents	
Cash paid on car by owner of monthly ticket		5 cents	
Children		4 cents cash or two for 7 cts	
Revenue Passengers:			
10 cents cash		43,834	
Commutation ticket passengers		49,313	
Children		5,673	
Total revenue passengers — November		98,819	
Total revenue passengers — October		108,916	
Decrease — passengers		10,097	
Decrease — per cent		9.27	
Passenger revenue			
10 cents cash		$4,383.40	
977 commutation tickets at 50 cents ea.	$488.50		
49,313 commutation ticket passengers at 5 cents each	2,465.65	2,945.15	
5,672 children		220.58	
Total passenger revenue — November		$7,558.13	(thirty days)
Total passenger revenue — October		7,034.62	(thirty-one days)
Increase November over October		523.51	
Per cent increase		7.44	
		Nov.	Oct.
Average receipts per revenue passenger—total		7.65 cents	6.48 cents
Average receipts per commutation ticket passenger—		6.11 cents	
Average commutation tickets outstanding for November—		851	
Average rides per ticket per day		1.732	
Average rides per ticket per month		51.95	

PLAN IN USE NOW IN TWO CITIES

At that time the plan had not been put into effect in any city. Finally, it has been put into force on two properties, and on one it has been in use since August, 1920, and on the other since October, 1921. Both of these properties are controlled by the United Light & Railway Company. The first is on the local lines in Mason City, Iowa, of the Mason City & Clear Lake Railway. The second is on the local lines in Muscatine, Iowa, of the Clinton, Davenport & Muscatine Railway. The Mason City lines have therefore had the system in use for about seventeen months and the Muscatine lines for three months.

The cash fare is 10 cents in each case, but any one can purchase a monthly commutation ticket for 50 cents, good for one month, and if this ticket is presented to the conductor when the passenger enters the car he is entitled to a ride on the payment of 5 cents. When the passenger boards the car he simply shows the card to the conductor and drops a nickel in the fare box. The conductor does not have to touch either the card or the money. Originally when the plan was inaugurated at Mason City a charge of $1 was made for a ticket, but later this charge was reduced to 50 cents and the sale of tickets nearly doubled. In the meantime in November, 1921, the first month in which the plan was installed, the company sold 977 commutation tickets. In December the number sold was more than 1,100.

Each month the card carries a distinctive color, and the name of the month for which the card is good is stamped in heavy ink over the entire card. The pass is good only for the person whose name appears on it, and if presented by any ~~one else~~ can be taken up by the company. While there is always some possibility that the card may be used by some other person the company considers the danger of this slight because if the owner of the card lets some one else use it he cannot ride for a nickel until the card is returned to him. A statement showing the results for November, 1921, with this system of fares on the Muscatine City lines as compared with October, 1921, when the fare for every passenger was 7 cents, is given in the accompanying table. As will be seen the receipts increased 7.44 per cent, although the average fare per commuting passenger was 6.11 cents, as against an average rate in October for all passengers of 6.48 cents.

When the plan was introduced in Muscatine it was well advertised in the daily papers and in other ways. In these advertisements a list was published of the places where the tickets could be purchased. They included a number of prominent stores in Muscatine. The following are extracts from some of the effective advertisements issued by the company as part of an aggressive sales campaign:

TO THE AUTOMOBILIST

Cold or wet weather makes walking or the using of your car a disagreeable task—why do it when you can ride in comfort for only 5 cents? Buy one of our commutation tickets today and laugh at the weather man. An economical, comfortable, companionable ride that brings you to the factory, store, office or home in a pleasant frame of mind, ready for a big day's work or an enjoyable evening

EAT LUNCH AT HOME

Enjoy your meals at home? I'll say you do. No fun eating from a dinner pail even if it is a full one. It only costs 10 cents to go home at noon for an honest to goodness meal with the folks. Monthly cards are still on sale at the regular places.

GET THE STREET CAR HABIT

Don't you remember the nice visits you used to have going downtown on the street cars? Get the street car habit again. It is pleasant, safe, comfortable and inexpensive, as well as "clubby." Purchase a November commutation ticket for 50 cents and ride as frequently as you desire for a nickel a ride.

NOT TOO LATE TO BUY NOW

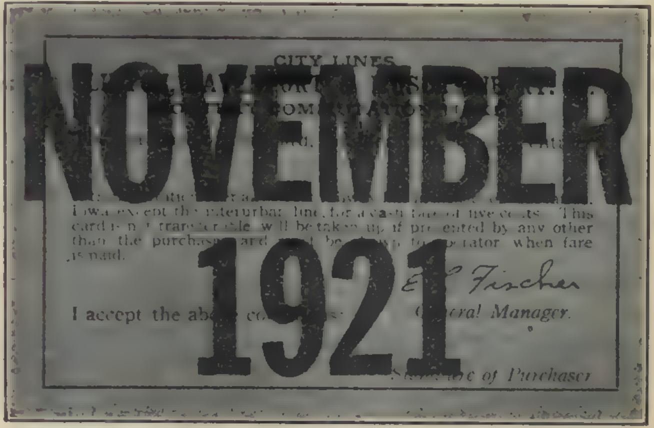
It is not too late to get a monthly commutation ticket. If you have been paying a 10-cent fare, don't do it again. You are wasting money. Just get a monthly ticket and only pay 5 cents a ride during the rest of the month. Don't forget to buy at once. Every day you delay is costing you 5 cents a ride more than it need to. They are still on sale at the regular places.

ADVANTAGES SUMMARIZED

Some of the merits of this system as summarized by Mr. Schaddelee in a statement within the last month and based on the experience mentioned are as follows:

"Under this scheme every one who boards the car puts into the fare box either a dime or a nickel, so that there is no making of change by the conductor. This greatly facilitates the handling of the cars and passengers, especially in the case of one-man cars, which are used exclusively in Muscatine and Mason City.

"The oftener the owner of a pass card rides during the month the less his average cost per ride is. With 200 rides per month, the total average cost is 5¼ cents. With 100 rides it is 5½ cents. With fifty rides it is 6 cents. With twenty-five rides it is 7 cents. With fifteen rides it is 8⅓ cents. The value of the plan is not so much in the 50-cent fixed charge, which the purchaser of the pass card pays to the company, but in the fact that the possession of the card induces him to ride a great deal oftener than he would if he had to pay the 10-cent fare charge for cash passengers every time he rides.



CITY LINES

NOVEMBER

1921

E. C. Fischer

General Manager.

Signature of Purchaser

THIS TICKET ENTITLES A PASSENGER TO RIDE FOR 5 CENTS WHEN THE CASH FARE IS 10 CENTS

"Simply to increase fares is no remedy where the revenues of a street railway company are insufficient, especially where the increases are made on the straight fare basis to everybody.

"Conditions have changed very greatly since the advent of the automobile. We have felt that people who used the service regularly, and by whose patronage only it is possible to continue the service, should obtain the lowest possible fare, and this in proportion to their use of the service. The visitor or the automobile driver who uses the street railway service only in inclement weather, or when his machine is out of commission, is fortunate to get reliable service as cheap as 10 cents a ride, as he is really getting the equivalent of taxicab service which he would otherwise have to employ.

"Our experience with the plan so far has been extremely satisfactory from the operating standpoint, and in addition to this it has taken very well with the public. It has the additional advantage that the resultant fare can be varied between any desired limit without changing the basic fares of 5 cents and 10 cents."

New Electric Rolling Stock Ordered

Total Number of New Cars Ordered During 1921 About One-third of that for 1920—Percentage of New Safety Cars of Total Number Ordered for City Passenger Service Also Decreased—Remodeling of Old Equipment Quite General

THE statistics for new electric rolling stock given in the tables herewith show in a very striking manner the low point to which the electric railway industry has fallen. The total of 1,276 new cars ordered during 1921 is about one-half that for any previous year recorded. The year 1918 held the previous low record with 2,419 cars and locomotives.

The totals for cars purchased during 1919 and 1920 were increased largely by the number of safety cars ordered, but during the past year safety car sales have decreased even in a greater ratio than have those for two-man cars used in city service. Only 565 safety cars were purchased during 1921, as compared with 1,699 for 1920 and 1,383 for 1919. The two largest car orders for the year were that of the city of Detroit for 225 safety cars and fifty Peter Witt type and that of the Toronto Transportation Commission for 140 two-man motor cars, sixty trailers and fifty Peter Witt type. This year's statistics include two rapid transit orders. The Frankford Elevated Railway of Philadelphia purchased fifty motor cars and the Hudson & Manhattan Railroad of New York twenty-five motor cars. Aside from these orders there were but nine other companies which purchased twenty or more cars. The Chicago Surface Lines purchased fifty trailers and constructed two motor cars in its own shops. The Los Angeles Railway Corporation purchased twenty-five safety cars and twenty-five 48-ft. passenger cars. The United Railways & Electric Company of Baltimore purchased thirty-two safety cars. The Southern Pacific Lines purchased twenty motor cars and ten trailers for interurban service. The Pacific Electric Railway Corporation purchased thirty cars for interurban service. The Hydro-Electric Power Commission purchased twenty-five safety cars, the New York, New Haven & Hartford Railroad purchased eight motor cars and fourteen trailers for interurban service, the Peoria Railway purchased twenty safety cars, and the

TABLE I—NEW ROLLING STOCK ORDERED SINCE 1907

Year	Passenger Cars City	Passenger Cars Interurban	Freight and Misc. Cars	Electric Locomotives	Total
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	605	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447
1920	2,889	227	465	17	3,598
1921	1,059	129	81	7	1,276

(a) Included in "Freight and Miscellaneous Cars."

TABLE II—SPECIAL COMPARISONS OF NEW ROLLING STOCK ORDERED

	1921	1920	1919	1918	1917	1916
Number of railways reporting new cars	94	172	160	140	182	250
Total number of cars	1,276	3,581	2,429	2,375	2,406	3,911
City Service:						
Number of safety cars	565	1,699	1,383	644	280	187
Number of two-man passenger motor cars*	383	847	635	1,068	1,316	2,731
Number of passenger trailers	111	343	111	130	402	128
Service cars	47	104	31	(a)	(a)	(a)
Total cars, city service	1,106	2,993	2,160	1,842	1,998	3,046
Interurban Service:						
Number of two-man passenger motor cars	103	195	96	200	158	303
Number of passenger trailers	26	32	32	55	27	71
Number of freight and express cars	34	361	141	(a)	(a)	(a)
Total cars, interurban service	163	588	269	255	185	374
Number of electric locomotives	7	17	18	44	49	31
Number of cars and electric locomotives built in railway companies' shops	44	166	165	89	281	445

* Includes motor and trailer cars for subway and elevated service.
(a) Not available.

TABLE III—ROLLING STOCK ORDERED DURING 1921

New England District

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Connecticut:					
The Connecticut Co.	3	Passenger	43'—0"	C	M
Danbury & Bethel St. Ry.	2	Safety	28' ½"	C	M
New York, New Haven & Hartford R.R.	8	Passenger	72'—7½"	I	M
New York, New Haven & Hartford R.R.	14	Passenger	72' 7½"	I	T
Waterbury & Milldale Tramway Co.	2	Passenger	37' 5"	I	M
Maine:					
Androscoggin Electric Co.	1	Passenger	47' 5"	I	M
Androscoggin Electric Co.	2	Snow Plows	15' 1"	I	M
The Androscoggin & Kennebec Ry.	3	Safety	28' ½"	C	M
The Androscoggin & Kennebec Ry.	*1	Line	40' 0"	C	M
The Androscoggin & Kennebec Ry.	*1	Work	43' 0"	C	M
Bangor Ry. & Electric Co.	6	Passenger	40' 3"	I	M
Massachusetts:					
Boston Elevated Ry.	4	Flat	40' 0"	C	T
Boston Elevated Ry.	2	Snow Plows	42' 4"	C	M
Massachusetts Northeastern St. Ry.	12	Safety	28' ½"	C	M
New Hampshire:					
Dover, Somersworth & Rochester St. Railway	4	Safety	28' ½"	C	M
Rhode Island:					
Newport County Electric Co.	*1	Snow Plow	40' 0"	C	M
United Electric Railways	4	Snow Plow	41' 0"	C	M
United Electric Railways	1	Sweeper	39' 0"	C	M
Total for New England District	71				

North of the Ohio and East of the Mississippi River

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Illinois:					
Alton, Granite & St. Louis Trac. Co.	9	Safety	28' ½"	C	M
Aurora, Elgin & Chicago R.R.	1	Passenger	46' 0"	I	T
Cairo Ry. & Lt. System	1	Mail	....	I	M
Centralia & Central City Trac. Co.	4	Safety	27' 9½"	C	M
Chicago Surface Lines	*1	Passenger	29' 4½"	C	M
Chicago Surface Lines	*1	Passenger	37' 2"	C	M
Chicago Surface Lines	50	Passenger	47' 6"	C	T
East St. Louis, Columbia & Waterloo Railway	1	Express	50' 0"	I	M
Illinois Central Elec. Ry.	6	Passenger	72' 0"	I	M
Peoria Ry.	20	Safety	28' ½"	C	M
Sterling, Dixon & Eastern Elec. Ry.	2	Safety	28' ½"	C	M
Indiana:					
Chicago, South Bend & N. Indiana Railway	*1	Express	53' 10"	I	M
Chicago, South Bend & N. Indiana Railway	*1	Snow Plow	47' 9"	I	M
Indiana Service Corporation	*1	Work	42' 0"	I	M
Union Traction Co. of Indiana	7	Stock	45' 6"	I	T
Union Traction Co. of Indiana	12	Safety	28' ½"	C	M
Maryland:					
The Hagerstown & Frederick Ry. Co.	1	Passenger	47' 9"	I	M
United Railways & Elec. Co.	32	Safety	30' 1"	C	M
Michigan:					
City of Detroit—Dept. of Street Rys.	50	Peter Witt	47' 3"	C	M
City of Detroit—Dept. of Street Rys.	50	Safety	27' 0"	C	M
City of Detroit—Dept. of Street Rys.	175	Safety	28' ½"	C	M
New Jersey:					
Morris County Traction Co.	1	Sweeper	....	C	M
New York:					
Albany Southern R.R.	*1	Freight	47' 0"	I	M
Elmira Water Light & R.R. Co.	11	Safety	27' 10"	C	M
Fonda, Johnstown & Gloversville R.R.	*2	Rotary Plows	25' 0"	I	M
Hudson & Manhattan R.R.	25	Passenger	51' 3½"	R.T.	M
Syracuse & Suburban R.R.	‡1	Rotary Plow	22' 2"	I	M
United Traction Co.	11	Safety	28' ½"	C	M
Western New York and Penna. Traction Co.	1	Sweeper	35' 0"	I	M
Ohio:					
The Cincinnati Traction Co.	2	Work	44' 0"	C	M
The Dayton & Western Traction Co.	2	Passenger	62' 5"	I	M
The Dayton & Western Traction Co.	2	Passenger	54' 11"	I	M
Shenango Valley Traction Co.	17	Safety	28' ½"	C	M
The Tiffin, Fostoria & Eastern El. Ry.	1	Work	40' 6"	I	M

(*Table III Continued on Page 35*)

TABLE III—ROLLING STOCK ORDERED DURING 1921

(Continued from Page 34)

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Pennsylvania:					
The Beaver Valley Traction Co.	10	Safety	27' 10"	C	M
Buffalo & Lake Erie Traction Co.	*1	Work	50' 0"	I	M
Conestoga Traction Co.	6	Safety	28' ½'	C	M
Eastern Pennsylvania Rwys.	1	Snow Plow	41' 0"	I	M
Ephrata & Lebanon St. Ry.	1	Freight	50' 0"	I	M
Fairchance & Smithfield Trac. Co.	1	Safety	28' ½"	C	M
Frankford Elevated Ry.	50	Passenger	55' 0"	R.T.	M
Johnstown & Somerset Ry.	4	Passenger	45' 0"	I	M
Johnstown Traction Co.	1	Sweeper	28' 3"	I	M
Lehigh Valley Transit Co.	1	Work	....	C	M
Northwestern Pennsylvania Ry.	1	Freight	35' 10"	I	M
Philadelphia Rapid Transit Co.	*1	Line	40' 2'	C	M
West Penn Railways	9	Passenger	56' 10"	I	M
West Penn Railways	10	Passenger	43' 0"	C	M
Wisconsin:					
Eastern Wisconsin Elec. Co.	6	Safet	28' ½"	C	M
Wisconsin-Minnesota Lt. & Pwr. Co.	4	Safety	27' 9½"	C	M
Wisconsin Public Service Co.	4	Safety	28' ½"	C	M
Total North of Ohio and East of Mississippi	614				

‡ Second hand.

South of the Ohio and East of the Mississippi River

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Florida:					
Miami Peach Electric Co.	8	Safety	28' ½"	C	M
Tampa Electric Co.	12	Safety	28' ½"	C	M
Georgia:					
Columbus Electric Co.	4	Safety	28' ½"	C	M
Georgia Ry. & Power Co.	6	Passenger	44' 6"	C	M
Georgia Ry. & Power Co.	*1	Work Car	34' 0"	C	M
Macon Ry. & Light Co.	13	Safety	28' ½"	C	M
Kentucky:					
Kentucky Traction & Terminal Co.	10	Passenger	40' 3"	I	M
Kentucky Utilities Co.	2	Safety	27' 9½"	C	M
North Carolina:					
Carolina Power & Light Co.	3	Safety	28' ½"	C	M
West Virginia:					
Charleston Interurban R.R.	8	Safety	27' 9½"	C	M
Total South of the Ohio and East of the Mississippi	67				

West of the Mississippi River

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
Arkansas					
Little Rock Ry. & Elec. Co.	1	Sweeper	28' 3"	C	M
Southwestern Gas & Elec. Co.	2	Safety	28' ½"	C	M
California:					
Glendale & Montrose Ry.	1	Safety	28' ½"	C	M
Los Angeles Ry. Corp.	25	Safety	28' ½"	C	M
Los Angeles Ry. Corp.	25	Passenger	48' 0"	C	M
Pacific Electric Ry. Corp.	30	Passenger	.. ..	I	M
San Francisco-Oakland Terminal Rys	*1	Passenger	48' 6"	C	M
Santa Barbara & Suburban Ry. Co.	11	Safety	28' ½"	C	M
Colorado					
Denver Tramway Co.	*20	Passenger	46' 0"	C	M
Denver Tramway Co.	2	Sweeper	45' 0"	C	M
Denver Tramway Co.	8	Sweeper	22' 0"	C	M
Denver Tramway Co.	2	Work	....	C	M
Denver Tramway Co.	5	Dump	....	C	T
Iowa:					
Burlington Ry. & Lt. Co.	8	Safety	28' ½"	C	M
Sioux City Service Co.	1	Safety	28' ½"	C	M
Kansas:					
Arkansas Valley Interurban Ry.	1	Safety	22' 4"	I	M
Minnesota:					
Twin City Rapid Transit Co.	*1	Passenger	46' 0"	C	M
Twin City Rapid Transit Co.	*1	Passenger	46' 0"	C	T‡
Mississippi:					
Delta Light & Traction Co.	4	Safety	28' ½"	C‡	M
Missouri:					
Cape Girardeau-Jackson Int. Ry.	3	Safety	28' ½"	C	M
Kansas City, Clay County & St. Joe. Railway	*6	Freight	41 0"	I	T
The Southwest Missouri R.R.	8	Safety	28' ½"	C	M
Nebraska:					
Omaha, Lincoln & Beatrice Ry.	1	Snow Plow	40' 0"	I	M
Oklahoma:					
Pittsburgh County Ry.	1	Passenger	43' 7"	I	M
Oregon:					
Southern Pacific Co.	20	Passenger	59' 7"	I	M
Southern Pacific Co.	10	Passenger	59' 7"	I	T
Texas:					
Abilene St. Ry. Co.	2	Safety	28' ½"	C	M
El Paso Electric Ry.	5	Safety	28' ½"	C	M
Rio Grande Valley Traction Co.	5	Safety	28' ½"	C	M
Utah:					
Bamberger Electric R.R.	1	Passenger	50' 0"	I	M
Bamberger Electric R.R.	1	Passenger	50' 0"	I	T
Total West of the Mississippi River	212				

Canada

	Number	Type	Over-all Length	City or Interurban	Motor or Trailer
British Columbia Elec. Ry.	10	Safety	28' ½	C	M
Hull Electric Co.	2	Safety	32' 0"	C	M
Hydro-Electric Railways	25	Safety	28' ½"	C	M
The Ottawa Electric Railway	2	Safety	28' ½"	C	M
Toronto Suburban Railway	1	Freight	....	I	M
Toronto Suburban Railway	1	Express	....	I	T
Toronto Transportation Commission.	140	Passenger	51' 10"	C	M
Toronto Transportation Commission.	60	Passenger	49' 2"	C	T
Toronto Transportation Commission.	50	Peter Witt	52' 3½"	C	M
Toronto Transportation Commission.	3	Work	....	C	M
Toronto Transportation Commission.	6	Sweepers	....	C	M
Winnipeg Electric Ry.	5	Safety	30' 3½"	C	M
Total for Canada	305				

* Built in company's shops. ‡ Second-hand.

TABLE IV—ELECTRIC LOCOMOTIVES

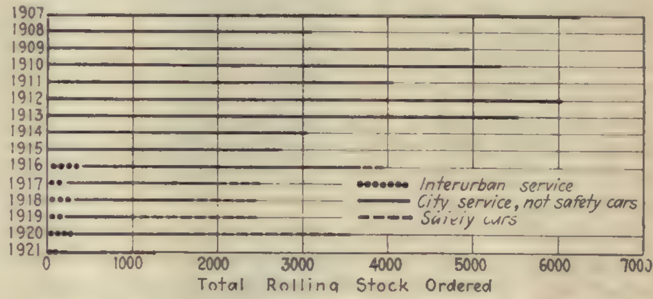
	Number	Weight Tons	Length Over All Ft.	Length Over All In.
North of the Ohio and East of the Mississippi River				
Chicago, South Bend & Northern Indiana Ry.	*1	..	47	9
Illinois Central Electric Ry.	1	..	..	..
Southern Illinois Railway & Power Co.	1	..	32	0
Washington & Old Dominion Railway	1	50	..	..
West of the Mississippi River				
Central California Traction Co.	*1	..	40	0
Pittsburgh County Railway (Oklahoma)	1	30	45	0
Tama & Toledo R.R. (Iowa)	1	..	30	0
Total	7			

*Built in company's shops.

Denver Tramway Company built twenty passenger cars in its own shops.

The number of companies that reported new equipment ordered during 1921 is ninety-four, as compared with 172 during 1920 and 160 during 1919. Of the ninety-four companies reporting, two purchased 250 cars or more, three fifty to sixty cars, one thirty-two, seven twenty to thirty cars, twelve from ten to twenty cars, seventeen from five to ten cars and fifty-two companies purchased less than five cars each. Safety cars were purchased by forty-five railways, as compared with 113 which invested in this type of car in 1920. Five of these railways were in Canada and they purchased forty-four safety cars.

An accompanying table and chart gives a comparison of the new rolling stock ordered by years since 1907.



NEW CARS AND LOCOMOTIVES ORDERED BY YEARS

In this chart the division by city and interurban cars is not made prior to 1916.

The table divides the passenger cars into city and interurban types and gives separate tabulations for freight and miscellaneous cars and electric locomotives. The chart for the years since 1916 divides the cars purchased into safety cars, those for city service (not safety cars) and those for interurban service.

A detailed classification of the cars ordered during the last six years is given in Table II. This gives separate comparisons of cars for city service and those for inter-

TABLE V—RECAPITULATION BY DISTRICTS OF CARS AND LOCOMOTIVES ORDERED DURING 1921

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total for United States	Total for Canada	Total
Number of companies reporting	12	43	9	23	87	7	94
Number of companies ordering safety cars	4	16	7	13	[redacted]	[redacted]	45
City Service							
Safety cars	21	374	50	76	521	44	565
Passenger cars, Motor	3	137	6	47	193	190	383
Passenger cars, Trailer	0	50	0	1	51	60	111
Service cars	14	5	1	18	[redacted]	9	47
Total cars city service	38	566	57	142	803	303	1,106
Interurban Service							
Passenger cars, Motor	17	24	10	52	103	0	103
Passenger cars, Trailer	14	1	0	11	26	0	26
Express and freight cars	2	23	[redacted]	7	32	2	34
Total cars interurban service	33	[redacted]	10	70	161	2	163
Electric locomotives	0	[redacted]	0	3	[redacted]	0	7
Total cars and electric locomotives ordered	71	618	67	215	971	305	1,276

urban service. All classes show a marked decrease in the number ordered over previous years. The number of passenger trailers for city service, however, is the same as for 1919 and the number of service cars ordered for city service is sixteen more than for the year 1919. Cars of all kinds built in railway shops total but forty-four, which is a large decrease over previous years. The number of interurban trailers purchased has decreased from thirty-two for 1919 and 1920 to twenty-six for 1921. An interesting comparison is afforded by the percentage that the number of safety cars purchased is of the total number of passenger cars for city service. This is 64.9 per cent for 1919, 58.8 per cent for 1920 and 53.3 per cent for 1921. The percentage is thus seen to be gradually decreasing.

Table III shows the details of rolling stock ordered by the individual companies. The companies for each state are alphabetically arranged and the various states are grouped into four districts in a similar manner to that followed last year. Canadian railways are listed separately. The totals for the various districts are seventy-one cars for the New England district, 614 cars and four locomotives north of the Ohio River and east of the Mississippi, sixty-seven cars south of the Ohio River and east of the Mississippi, 212 cars and three locomotives west of the Mississippi and 305 cars for Canadian railways. The table gives information as to the number and types of cars purchased, the class of service and their over-all length. A recapitulation of the totals for cars and locomotives ordered is given in Table V.

The companies which purchased or built electric locomotives during 1921 are listed in Table IV. There are but seven of these, which is the smallest number for any year of which we have a record.

The information given in these tables was obtained from replies received to questionnaires sent to all electric railways in the United States and Canada. Answers were received from more than 750 railways and the information thus received has been supplemented by notes previously published and by lists furnished by the various car builders. Through the courtesy and co-operation of the car builders it has been possible to check these figures very accurately, and in some cases where railways did not report the figures as furnished by the car manufacturers have been used.

The ELECTRIC RAILWAY JOURNAL wishes to thank all who co-operated in making this list so complete and made possible the publication of this information.

Automotive Equipment Owned by Electric Railways

Survey of the Industry Shows that Nearly 1,500 Cars Are Used in Conducting Transportation, Maintaining Track and Overhead, and for Emergency Purposes

UNTIL this year the ELECTRIC RAILWAY JOURNAL has never made any attempt to secure statistics on the automotive equipment owned by the electric railways. Figures have been compiled which show how many automobiles are required to make possible the carrying out of certain phases of work. The information is presented under the same classifications as the rolling stock and track mileage statistics, *i.e.*, by states, which are segregated by territories. Since this is the first time the industry has been solicited for data on automotive equipment, the table is not as complete as those which have been compiled from year to year by the ELECTRIC RAILWAY JOURNAL. However, replies were received from practically all the large companies and the figures may be said to represent roughly 90 per cent of the total equipment in use by the electric railways.

Practically it is almost impossible to present this material in such a compact manner as to indicate simultaneously the type and capacity of a truck and the service in which it is employed. The classification according to service seemed the most desirable way to collate the information. Of the service cars the tower wagons probably form a more rigid classification than those of any other type. The other uses in electric railway work to which a truck can be put require so little body construction of a special nature that a machine with a flat body is an extremely versatile piece of equipment. For this reason it is correspondingly difficult to assign each vehicle to any particular designation. Nevertheless this has been done according to the information furnished. Therefore under each particular grouping have been placed trucks of various capacities and with different types of bodies.

STATISTICS OF AUTOMOTIVE EQUIPMENT OWNED BY ELECTRIC RAILWAYS IN THE UNITED STATES*

	Service Cars						Passenger Cars		
	Tower Wagons	Line Maint.	Track Maint.	Trucks	Emergency	Miscellaneous	Touring	Roadsters	Closed
New England States:									
Connecticut	5	3	0	6	0	6	9	2	1
Maine	1	1	2	1	0	0	4	11	4
Massachusetts	37	5	38	30	4	6	32	43	2
New Hampshire	..	..	..	..	..	..	..	...	..
Rhode Island	0	0	1	1	0	0	5	0	0
Vermont	0	1	0	0	0	0	0	0	0
Total	43	10	41	38	4	12	50	56	7
Eastern States:									
Delaware	..	..	..	..	..	..	..	...	..
District of Columbia	0	2	1	7	4	1	1	...	1
Maryland	5	4	5	5	0	4	6	1	1
New Jersey	..	..	..	..	..	..	..	...	..
New York	18	16	42	14	7	11	13	30	5
Pennsylvania	11	10	2	10	1	5	11	4	2
Virginia	1	1	0	0	0	0	0	0	0
West Virginia	2	3	2	1	0	1	3	3	..
Total	37	36	52	37	12	22	34	38	9
Central States:									
Illinois	7	14	7	23	0	0	4	5	1
Indiana	5	9	3	1	0	4	16	4	1
Iowa	4	4	4	1	1	3	3	19	1
Kentucky	4	3	3	3	0	2	3	2	0
Michigan	6	3	1	12	1	0	14	6	5
Minnesota	5	0	0	4	0	7	4	5	4
Missouri	21	5	8	11	1	10	9	18	5
Ohio	14	24	17	10	2	11	18	16	3
Wisconsin	1	29	6	9	0	0	25	33	4
Total	67	91	49	74	5	37	96	108	24
Southern States:									
Alabama	2	6	6	3	0	3	3	0	0
Arkansas	0	3	0	0	0	0	0	0	0
Florida	1	0	0	0	0	0	0	0	0
Georgia	4	3	1	6	0	1	12	3	0
Louisiana	1	6	15	0	0	1	0	1	0
Mississippi	0	1	0	0	0	1	3	0	0
North Carolina	0	0	0	0	0	1	0	0	0
South Carolina	1	0	0	0	0	0	1	0	0
Tennessee	3	2	3	1	0	1	2	3	0
Total	12	21	25	10	0	8	21	7	0
Western States:									
Arizona	0	0	0	1	0	0	..	...	..
California	20	17	29	10	4	6	21	16	0
Colorado	4	0	3	2	0	1	8	2	0
Idaho	0	0	0	1	0	0	0	0	0
Kansas	2	1	2	1	0	0	2	1	0
Montana	0	0	0	1	0	1	0	0	0
Nebraska	1	2	3	0	0	2	6	0	0
Nevada	..	..	..	..	..	..	..	...	..
New Mexico	..	..	..	..	..	..	..	...	..
North Dakota	..	..	..	..	..	..	..	...	..
Oklahoma	1	1	0	1	1	0	0	0	0
Oregon	5	0	1	0	1	0	4	1	0
South Dakota	..	..	..	..	..	..	..	...	..
Texas	12	3	3	7	2	46	7	1	0
Utah	1	0	0	0	0	0	1	0	0
Washington	3	1	3	0	0	4	5	8	0
Wyoming	..	..	..	..	..	..	..	...	..
Total	49	25	45	24	8	60	54	29	0
Totals	208	183	212	183	29	139	255	238	40

Total service cars—954 Total passenger cars—533

*Exclusive of motor buses, for which see ELECTRIC RAILWAY JOURNAL, Aug. 27, 1921, page 319.

The differentiation between service cars and passenger cars also is not distinct. There are many service cars constructed from passenger car chassis, while in the same way trucks are used for several purposes such as line and track maintenance. Some vehicles are also used as line cars and as a means of transport for transportation and other officials. This is true more especially on the smaller properties. It was attempted, however, to put a passenger car under this classification whenever it was clearly such, regardless of the duty it performed.

Some additional facts revealed by the survey but not included in the tabulation may be of interest. About one-third of the service cars have a chassis of 1-ton capacity. Of these approximately two-thirds are equipped with pneumatic tires. The next largest grouping is the 2-ton cars, which includes nearly 200 vehicles. Only one-third of this latter classification have pneumatic tires. Of the 533 passenger cars, 267 are Fords while 68 are Dodges. The remaining 198 are distributed among nearly as many makes.

Improved Financial Condition Established

War-Time Period a Disastrous One for Electric Railways—Return of More Normal Conditions Helps Companies—Fewer New Receiverships This Year—Three Terminated Without Foreclosure

A CONTINUATION of the tendency toward an improvement of conditions in the street railway industry is evident from the statistics of electric railway receiverships and foreclosures for the year 1921, presented herewith. One year ago a change for the better was noted in this paper in the corresponding article on electric railway receiverships. The rising tide in the number of receiverships and foreclosures, and the amount of mileage and securities involved, reached its maximum point in the statistics of the year 1919. In 1920 there was a material reduction in the number of additional companies so involved, and the past year, 1921, showed a further, though slight decrease. Only six companies were reported as having abandoned their entire service and track, as compared with sixteen companies during 1920. Evidently the weakest properties have been now pretty completely eliminated through drastic reorganizations or total abandonments.

During 1921 sixteen additional companies went into receivership, and thirteen companies were sold at foreclosure, or drastically reorganized. The total single track mileage of the companies which went into receivership during 1921 was 917.82. Only one large company was included, the Ohio Electric Railway Company, which with its three subsidiaries, the Indiana, Columbus & Eastern Traction Company, the Fort Wayne, Van Wert & Lima Traction Company and the Columbus, Newark & Zanesville Electric Railway Company, made up 497 miles of the 917-mile total.

The threatened receivership of the Interborough Rapid Transit Company, New York, had it occurred this year, would have swollen greatly the figures of mileage and securities in receiverships. Fortunately, this has not occurred, although the matter is still before the court for settlement. The date for the next hearing of

TABLE I—RECORD OF ELECTRIC RAILWAY RECEIVERSHIPS

Year	Number of Companies	Miles of Single Track Involved	Outstanding Stock	Securities Bonds
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	221,259,354	312,915,104
1920(*b*)	19(*b*)	1,065.31	28,758,455	72,283,575
1921	16	917.82	31,150,550	34,613,200

TABLE II—RECORD OF ELECTRIC RAILWAY FORECLOSURE SALES

Year	Number of Companies	Miles of Track Involved	Outstanding Stock	Securities Bonds	Receiver's Certificates
1909	21	488.00	$22,265,700	$21,174,000	(*a*)
1910	22	724.36	19,106,613	26,374,075	(*a*)
1911	25	660.72	91,354,800	115,092,750	(*a*)
1912	18	267.18	14,197,300	10,685,250	(*a*)
1913	17	302.28	15,243,700	19,094,500	(*a*)
1914	11	181.26	26,239,700	44,094,241	(*a*)
1915	19	308.31	30,508,817	16,759,997	(*a*)
1916	19	430.14	13,895,400	22,702,300	(*a*)
1917	26	745.19	27,281,900	27,313,045	(*a*)
1918	23	524.22	37,740,325	20,149,384	(*a*)
1919(*c*)	29(*c*)	2,675.48	89,893,400	79,836,738	$42,300
1920(*d*)	13(*d*)	259.90	7,782,400	11,227,328	52,000
1921	13	777.97	33,642,255	30,863,576	5,000

(*a*) No data available.

(*b*) Corrected by adding to figures shown last year, data for three companies: Bryan (Tex.) & Central Texas Interurban Ry.; Cumberland Ry. & Pwr. Co. of N. C.; and the Rock Island Southern Ry., which went into receivership in 1920, but were omitted through failure to receive information.

(*c*) Corrected by adding to figures shown last year, data for Scranton (Pa.) and Binghamton Ry., which was foreclosed in 1919, but omitted from list through failure to receive information.

(*d*) Corrected by adding to figures shown last year, data for two companies, Bay State St. Ry. (Newport Division); and the Jackson (Miss.) Lt. & Traction Co., both foreclosed in 1920, but omitted from list through failure to receive information.

TABLE III—ELECTRIC RAILWAY RECEIVERSHIPS—1921
(Listed alphabetically by States)

	Miles
Concord, Maynard & Hudson St. Ry. (Greenfield, Mass.)	18.15
Connecticut Valley St. Ry. (Greenfield, Mass.)	47.05
Northern Massachusetts St. Ry. (Greenfield, Mass.)	44.09
New York & North Shore Trac. Co. (Roslyn, N. Y.)	38.12
Houghton County Traction Co. (Mich.)	32.15
Saginaw-Bay City Railway (Mich.)	64.22
Maumee Valley Ry. & Lt. Co. (Toledo, Ohio)	23.21
Ohio Electric Ry. Co. (Springfield, O.)	82.90
Columbus, Newark & Zanesville Elec. Ry. Co. (*b*)	95.85
Indiana, Columbus & Eastern Trac. Co. (*b*)	257.20
Fort Wayne, Van Wert & Lima Trac. Co. (*b*)	61.63
Toledo (O.) & Western R. R. Co.	84.08
Ephrata & Lebanon (Pa.) St. Ry.	24.00
So. Carolina Lt., Power & Ry. (Spartansburg)	21.00
Austin (Tex.) St. Ry.	22.67
Standard Traction Co. (Dallas, Tex.) (c)	1.50
Total for 1921 (sixteen companies)	917.82

(*a*) Data not available.
(*b*) Subsidiary of Ohio Electric Ry. Co., now operated under separate receiver.
(*c*) Receiver has leased it to Dallas Railway Co.

(Note) Three companies in receivership in 1920 were omitted from last year's list, because of failure to receive data; they were: Bryan & Central Texas Interurban, Cumberland (N. C.) Ry. Pwr. Co., Rock Island (Ill.) Southern Ry.

TABLE IV—ABANDONMENTS—ENTIRE—1921
(Includes only companies whose entire traction property has been dismantled or permanently abandoned and not likely to resume operations)

	Miles	Stock	Bonds
Thane (Alaska) Perseverance Ry.	5.25	(*a*)	(*a*)
Douglas (Ariz.) Traction & Lt. Co.	(*a*)	(*a*)	(*a*)
Washington (D.C.) Great Falls Ry. & Pwr. Co.	(*a*)	(*a*)	(*a*)
Plymouth & Shelby Traction Co. (Norwalk, O.)	6.97	$200,000	$200,000
Sandusky, Norwalk (O.) & Mansfield Elec. Ry.	33.00	600,000	600,000
Bartlesville (Okla.) Interurban Co.	10.10	(*a*)	(*a*)
Total for 1921 (6 companies)	56.32	800,000	800,000

(*a*) Data not available.

the petition for a receiver for the company has been set for Jan. 30. Recent statements by responsible officials of the Interborough Rapid Transit Company seem to indicate that they expect to be able to meet obligations during the coming year without the necessity of the intervention of a receiver. Several of the companies that are still in receivership are now reporting more satisfactory earnings and there is every indication that the current year will see the discharge of many receivers. The readjustment of fares to a reasonable and profitable basis, the reductions in prices and wages, and the cutting off of unprofitable lines, or parts of lines, are factors which are all helping to bring about a better and more healthy financial condition of the industry. Plans for the reorganization of the Pittsburgh and New Orleans properties are said to be approaching completion without likelihood of foreclosure. It is especially interesting to note that in at least three cases during the year just past, receivers have been discharged without foreclosure or reorganization of the companies involved owing to their improved financial condition. These were the Atlantic City & Shore Railroad Company, Atlantic City, N. J.; the Denver (Col.) In-

TABLE V— ELECTRIC RAILWAY RECEIVERSHIPS AND FORECLOSURES AS OF DEC. 31, 1921

	Year of Receivership	Miles of Single Track Involved	Outstanding Securities		
			Capital Stock	Funded Debt	Receivers' Certificates
New England District					
Connecticut					
Danbury (Ct.) & Bethel St. Ry.	1917	13.00	$320,000	$588,500	$85,000
Hartford & Springfield St. Ry. (Warehouse Pt.)	1918	48.00	785,000	961,000	None
Shore Line Electric Ry. (c)	1919	67.20	1,000,000	6,700,000	None
Maine					
Atlantic Shore Ry. (Kennebunk)	1915	49.93	1,000,000	1,746,250	None
Massachusetts					
Brockton & Plymouth (Mass.) St. Ry.	1919	22.00	250,000	260,000	None
Concord, Maynard & Hudson St. Ry. (Greenfield)	1921	18.15	235,000	230,000	None
Connecticut Valley St. Ry. (Greenfield)	1921	47.05	620,000	580,000	None
Northern Massachusetts St. Ry. (Greenfield)	1921	44.09	500,000	500,000	None
New Hampshire					
Portsmouth, Dover (N.H.) & York St. Ry.	1917	42.33	(d)	707,000	20,000
Rhode Island					
Bay State St. Ry. (Newport Div.) (bb)	1917	22.20	(b)	996,800	None
Rhode Island Co. (Providence) (a)	1919	101.15	9,685,500	1,662,000	None
United Traction & Electric Co. (a)	1919	289.93	8,000,000	9,000,000	None
Rhode Island Suburban Ry. (Providence) (a)	1920	74.70	5,000,000	(f) 4,998,200	None
Vermont					
Springfield (Vt.) Elec. Ry.	1918	9.00	100,800	100,000	5,000
Barre & Montpelier (Vt.) Traction & Pwr. Co.	1920	9.75	(v)	(g)340,771	None
Summary					
Total 1/1/21	12 cos.	760.65	28,478,300	29,415,800	102,323
Net changes and corrections	*1 co.*	*33.66*	*2,337,000*	*2,352,079*	7,677
Receiverships added during 1921	3 cos.	109.29	1,355,000	1,310,000	None
Less Properties sold or reorganized during 1921	*8 cos.*	*465.78*	*22,685,500*	*15,660,200*	None
Net receiverships 12/31/21	11 cos.	370.50	4,810,800	12,713,521	110,000
North of the Ohio and East of the Mississippi River					
Illinois					
Chicago (Ill.) & Oak Park Elevated R.R.	1911	22.66	$10,000,000	$5,595,000	$1,758,000
Chicago, Aurora (Ill.) & De Kalb R.R. (h)	1916	30.20	950,000	427,500	None
Aurora, Elgin & Chicago R.R. (Wheaton) (h)	1919	168.00	6,200,000	8,371,000	None
Alton (Ill.) Granite & St. Louis Traction Co.	1920	62.00	3,189,000	3,000,000	None
Rock Island (Ill.) Southern Ry. (a)	1920	(l)46.00	2,944,800	3,343,000	None
Indiana					
Winona Interurban Ry. Co. (Warsaw)	1916	70.00	750,000	2,343,700	None
Beech Grove (Ind.) Traction Co.	1917	3.90	150,000	100,000	None
Vincennes (Ind.) Traction Co.	1919	7.50	350,000	235,000	None
Michigan					
Marquette City & Presque Isle (Mich.) Ry. (h)	1912	6.00	200,000	100,000	None
Saginaw-Bay City Ry.	1921	64.22	2,600,000	2,063,000	None
Houghton County Traction Co. (Houghton)	1921	32.15	957,200	677,000	None
New Jersey					
North Jersey Rapid Transit Co. (Hohokus)	1912	18.00	800,000	800,000	None
Atlantic City (N.J.) & Shore R.R. Co. (b)	1915	49.89	1,000,000	950,000	None
Monmouth County Elec. Co. (Red Bank)	1916	18.50	350,000	500,000	17.500
New York					
Second Ave. R.R. (New York City)	1908	30.02	1,862,000	5,720,000	3,140,000
Rochester (N.Y.) Corning & Elmira Trac. Co. (j)	1912	(j)6.00	271,000	1,000,000	None
Buffalo (N.Y.) & Lackawanna Trac. Co.	1918	8 80	55,000	1,000,000	None
Hornell (N.Y.) Traction Co.	1917	10.90	117,900	150,000	25,000
Manhattan & Queens Trac. Co. (Long Isl. City)	1917	21.20	(i) 20,000	(i) 2,090,000	None
Binghamton (N.Y.) Ry. Co.	1918	49.75	978,995	2,410,000	40,000
Buffalo (N.Y.) & Depew Ry.	1918	13.59	305,000	350,000	60,000
Penn Yan (N.Y.) & Lake Shore Ry.	1918	8.50	94,000	100,000	None
Brooklyn Rapid Transit Co. (e)	1918	(Holding Co.)	74,455,159	68,144,000	18,000,000
New York Consolidated Ry. (e)	1918	141.68	683,184	22,967,000	None
New York Municipal Ry. Corp. (e)	1918	67.82	....	2,265,000	....
Surface Lines					
Brooklyn Heights R. R. (e)	1919	36.60	....	250,000	None
Brooklyn, Queens County & Suburban R. R. (e)	1919	61.92	....	4,566,000	34,353
Nassau Electric Ry. (e)	1919	144.39	105,225	13,588,928	320,773
Coney Island & Brooklyn Ry. (e)	1919	59.53	297,400	5,480,000	None
Interborough Consolidated Corp. (e)	1919	(Holding Co.)	50,403,634	63,808,000	None
New York (N. Y.) Railways Co. (e)	1919	(k) 97.72	(k) 6,055,202	69,081,685	None
Richmond Lt. & R.R. Co. (Staten Island)	1920	32.05	(n) 1,932,000	(n) 1,482,000	None
Staten Island (N.Y.) Midland Ry. Co.	1920	28.68	1,000,000	1,000,000	None
Western New York & Penn. Trac. Co. (Olean) (a)	1920	100.00	1,599,355	2,492,000	None
Westchester St. R.R. of White Plains	1920	21.60	700,000	168,000	17,400
Shore Line Elec. R.R. (White Plains)	1920	1.46	50,000	None	None
New York & North Shore Trac. Co.	1921	38.12	979,350	770,000	11,000
Ohio					
Sandusky, Norwalk (O.) & Mansfield Elec. Ry. (a)	1912	33.00	600,000	600,000	None
Cincinnati (O.) Lawrenceburg & Aurora Elec. St. Ry.	1913	31.89	808,900	750,000	None
Interurban Ry. & Terminal Co. (Cincinnati) (h)	1914	41.03	3,500,000	1,650,000	49,000
Plymouth & Shelby Trac. Co. (Norwalk) (a)	1917	6.97	200,000	200,000	None
Ohio River Elec. Ry. & Pwr. Co. (Pomeroy)	1919	12.70	300,000	315,000	None
Cleveland (O.) Alliance & Mahoning Valley R.R.	1920	46.00	1,100,000	1,100,000	10,000
Ashtabula (O.) Rapid Transit Co.	1920	5.50	500,000	382,000	7,500
Ohio Electric Ry. (Springfield) (o)	1921	82.90	11,000,000	7,254,200	None
Columbus, Newark & Zanesville Elec. Ry.	1921	95.85	2 025,000	4,704,000	None
Fort Wayne, Van Wert & Lima Trac. Co.	1921	257.20	4,025,000	7,900,000	None
Indiana, Columbus & Eastern Trac. Co.	1921	61.63	1,000,000	1,470,000	None
Maumee Valley Railway & Lt. Co. (Toledo)	1921	23.21	1,000,000	800,000	None
Toledo & Western RR. Co. (Sylvania)	1921	84.08	2,000,000	2,000,000	None

(*Continued on next page*)

NOTES

(a) Sold at foreclosure or reorganized during 1921.

(aa) Sold at foreclosure in 1920—information not received in time for last year's tabulation.

(aaa) Sold at foreclosure in 1919—carried in table to date because information not heretofore available.

(b) Receiver discharged in 1921 without foreclosure.

(bb) Operation by receiver was terminated in 1920, when Newport County Electric was formed to take over lease from receivers of former Bay State Street Ry.

(c) Shore Line Electric Railway is being dismembered and reorganized under receiver.

(d) Included in that of Atlantic Shore Railway.

(e) Securities shown are shown as recently tabulated by New York Transit Commission as being outstanding and in the hands of the public. See *Electric Railway Journal*, Dec. 17, 1921.

(f) Includes bonds of certain subsidiary lines involved.

(g) Receiver estimates value of railway share of securities at $340,771.

(h) Included in last year's report. No information available as to present status.

(i) No bonds issued. Cost of construction carried by temporary notes.

(j) This company is reported as having had right of way, but no track built. No further information available.

(k) Excludes track and securities of formerly controlled companies, which have been returned to their owners.

(l) Part electric, part steam operation.

(m) Road under construction by new company.

(n) Figures cover only proportion of securities represented by railway property. Estimated at 67.4% of total.

(o) The three subsidiaries of the Ohio Electric Ry., are in separate receivership and are shown separately, directly following.

(p) Figures cover only proportion of securities represented by railway property. Estimated at 57.2% of total.

(q) Figures cover total combined property—railway value cannot be separated.

(r) Includes notes and bank loans.

(s) Receivership limited to Chattanooga railway lines only.

(t) Figure given is for railway lines only.

(u) But three miles of road is electrified, balance operated by steam. Figures are given for the entire road.

(v) Stock has no par value—nominal value given.

(w) No information available.

terurban Railroad Company, and the Caldwell (Idaho) Traction Company.

The record of foreclosures during the year 1921 includes thirteen companies, the same in number as the previous year. Although the total securities involved in the foreclosures is considerably larger than in the preceding year, the greatest part of them were confined to the Rhode Island Company and its subsidiaries. This company has been in receivership since 1919, and the receivership has been disposed of finally through the formation of a new company which has taken over the old properties of the company through the foreclosure sale.

There have been several complete reorganizations of large companies consummated during the year 1921 without the intervention of a receiver, notably the United Railroads of San Francisco, now organized and operating with a reduced capitalization as the Market Street Railway.

In order to permit comparisons with previous years the statistics have been presented herewith in the usual fashion. Tables I and II give record of electric railway receiverships and foreclosures by years since this work was first begun in 1909. The figures given in these first two tables are not cumulative but show the new companies involved in each individual year. The figures have been corrected, in line with information received since they were published a year ago, consequently in comparing them with last year's issue, attention should be given to the footnotes. The outstanding securities of the Brooklyn Rapid Transit Company and its subsidiaries, the Interborough Consolidated Corporation and the New York Railways Company, have been revised and corrected to correspond with the tabulations recently published by the New York Transit Commission. They now represent the actual net amounts of stock, bonds and receivers' certificates held by the public, eliminating, as

TABLE V—ELECTRIC RAILWAY RECEIVERSHIPS AND FORECLOSURES AS OF DEC. 31, 1921

	Year of Receivership	Miles of Single Track Involved	Outstanding Securities: Capital Stock	Funded Debt	Receivers' Certificates
Pennsylvania					
Philadelphia & Easton Elec. Ry. (Doylestown) (a)	1912	31.00	$612,600	$911,000	None
Sunbury (Pa.) & Susquehanna Ry. (h)	1913	9.20	600,000	640,000	None
North Branch Transit Co. (Bloomsburg)	1915	30.00	500,000	532,500	None
Buffalo & Lake Erie Traction Co. (Erie)	1915	168.00	7,500,000	7,066,000	920,000
Pittsburgh (Pa.) Railways	1918	605.25	21,726,750	41,579,500	None
Scranton (Pa.) & Binghamton Ry. (aaa)	1918	50.00	6,000,000	4,100,000	None
Philadelphia (Pa.) Rys. Co.	1919	16.00	400,000	400,000	None
Northampton Traction Co. (Easton) (a)	1919	21.00	500,000	1,009,000	5,000
Northampton, Easton (Pa.) & Wash. Trac. Co.	1919	17.80	1,250,000	739,000	None
Cleveland & Erie Ry. (Girard)	1920	30.00	300,000	1,000,000	None
Ephrata & Lebanon St. Ry. Co.	1921	24.00	189,000	250,000	None
Summary					
Total 1/1/21	49 cos.	2,556.52	144,387,360	297,348,035	23,983,300
Net changes and connections	*2 cos.*	*56.21*	62,879,744	54,453,778	421,226
Receiverships added during 1921	10 cos.	763.36	25,775,550	27,888,200	11,000
Less those sold or reorganized during 1921	*6 cos.*	*237.97*	*6,456,765*	*8,555,000*	*5,000*
Net receiverships 12/31/21	51 cos.	3,025.70	226,585,899	371,135,013	24,410,526
South of the Ohio and East of the Mississippi River					
Alabama					
Birmingham (Ala.) Tidewater Ry.	1919	32.63	325,000	1,500,000	17,000
Birmingham (Ala.) Ry. Lt. & Power Co.	1919	154.40	(p) 4,230,000	(p) 8,820,000	489,060
Montgomery (Ala.) Lt. & Traction Co.	1919	38.00	(q) 2,000,000	(q) 1,430,000	(q) 250,000
North Alabama Traction Co. (Albany)	1919	7.63	75,000	225,000	None
Florida					
Jacksonville (Fla.) Traction Co.	1919	63.94	1,500,000	(r) 3,263,500	65,000
Pensacola (Fla.) Electric Co.	1920	22.70	(q) 1,100,000	(q) 1,762,900	(q) 25,000
Georgia					
City & Suburban Ry. Co. (Brunswick) (a)	1919	9.50	100,000	194,000	None
Savannah (Ga.) Elec. Co. (a)	1919	57.72	(q) 3,500,000	(qr) 6,074,376	None
Mississippi					
Jackson (Miss.) Lt. & Trac. Co. (aa)	1919	13.50	(q) 1,600,000	(q) 915,000	None
North Carolina					
Cumberland Ry. & Pwr. Co. (a)	1920	(m)	500,000	80,000	None
South Carolina					
So. Carolina Lt., Pwr. & Rys. Co. (Spartanburg)	1921	21.00	3,200,000	4,629,000	None
Tennessee					
Memphis (Tenn.) St. Ry.	1919	130.40	5,000,000	8,095,000	None
Chattanooga (Tenn.) Ry. & Lt. Co. (s)	1919	68.00	(q) 5,000,000	(t) 2,790,000	None
West Virginia					
Morgantown (W. Va.) & Wheeling Trac. Co. (u)	1916	(u) 27.00	345,000	500,000	214,000
Grafton (W. Va.) Lt. & Pwr. Co. (a)	1917	7.00	(t) 400,000	(t) 300,000	None
Summary					
Total 1/1/21	13 cos.	532.74	25,175,000	34,737,280	715,000
Net changes and corrections	....	86.18	*1,100,000*	297,496	345,060
Receiverships added during 1921	1 co.	21.00	3,200,000	4,629,000	....
Less those sold or reorganized during 1921	*4 cos.*	*74.22*	*4,500,000*	*6,648,376*	....
Net receiverships 12/31/21	10 cos.	565.70	22,775,000	33,015,400	1,060,060
West of the Mississippi River					
Arizona					
Tucson (Ariz.) Rapid Transit Co.	1919	4.35	500,000	114,800	None
Colorado					
Denver (Col.) & Interurban R.R. (b)	1918	44.43	101,500	1,079,000	None
Denver (Col.) Tramway Co.	1920	225.51	6,156,300	17,663,585	None
Idaho					
Caldwell (Id.) Traction Co. (b)	1920	11.40	250,000	None	None
Iowa					
Des Moines (Ia.) City Ry. Co.	1918	94.00	1,305,000	5,981,000	10,000
Kansas					
Southwestern Interurban Ry. (Winfield)	1919	25.00	150,000	None	None
Louisiana					
New Orleans (La.) Ry. & Lt. Co.	1919	222.12	(q) 30,198,850	(q) 38,361,200	(q) 1,180,000
Minnesota					
St. Paul Southern Electric Ry. Co. (Hastings) (h)	1918	17.54	658,225	425,400	40,000
Missouri					
Kansas City (Mo.) Outer Belt Elec R.R. (h)	1912	(j)	None	1,298,000	100,000
Kansas City, Ozark & Southern Ry. (Ava) (h)	1913	15.00	300,000	None	....
Kansas City (Mo.), Lawrence & Topeka R.R.	1919	12.00	250,000	400,000	None
United Railways Co. of St. Louis, Mo.	1919	460.72	41,296,000	50,690,000	4,200,000
Missouri Electric R.R. (St. Louis)	1919	18.96	1,000,000	700,000	None
Kansas City (Mo.) Railways	1920	314.68	(v) 100,000	30,272,128	None
Oregon					
Southern Oregon Traction Co. (Medford) (h)	1918	8.19	150,000	150,000	....
Texas					
Corpus Christi (Tex.) Ry. & Lt. Co.	1919	9.75	....	(q) 1,694,507	14,539
Bryan (Tex.) & College Interurban Ry. (h)	1920	7.75	(w)	(w)	(w)
Bryan & Central Texas Interurban	1920	27.20	(w)	(w)	(w)
Austin (Tex.) St. Ry.	1921	22.67	810,000	786,000	None
Standard Traction Co. (Dallas)	1921	1.50	10,000		
Summary					
Total 1/1/21	17 cos.	1,480.34	82,416,275	152,579,082	4,091,539
Net changes and corrections	*1 co.*	*17.57*	*351,900*	*4,828,462*	1,453,000
Receiverships added during 1921	2 cos.	24.17	820,000	786,000	....
Less than sold or reorganized during 1921	None	....	....	....	....
Net receiverships 12/31/21	18 cos.	1,486.94	82,884,375	148,536,620	5,544,539
RECAPITULATION					
Total 1/1/21	91 cos.	5,330.25	280,456,935	514,080,197	28,892,162
Net changes and connections	*4 cos.*	*21.26*	59,090,844	47,570,733	2,226,963
Receiverships added during 1921	16 cos.	917.82	31,150,550	34,613,200	11,000
Less those sold or reorganized during 1921	*13 cos.*	*777.97*	*33,642,255*	*30,863,576*	*5,000*
Net receiverships 12/31/21	90 cos.	5,448.84	337,056,074	565,400,554	31,125,125

far as possible, inter-corporate holdings, which are duplicated by other securities. Complete statistics of the outstanding securities of the various companies in Greater New York, as tabulated by the New York Transit Commission, were published in the Dec. 17 issue of the ELECTRIC RAILWAY JOURNAL.

TABLE VI—ABANDONMENTS—PARTIAL—1921

(Includes all pieces of track, sidings, yards, etc., permanently abandoned—Companies arranged alphabetically by States)

	Miles
Monterey (Cal.) & Pacific Grove Ry	1.00
Peninsula Railway (San Jose, Cal.)	0.46
San Francisco—Oakland (Cal.) Term. Rys	0.52
Denver (Colo.) Tramways	2.22
Connecticut Co. (New Haven)	0.62
Shore Line Elec. Ry. (Norwich, Conn.)	15.77
Washington (D. C.) Ry. & Elec. Co	2.47
Georgia Ry. & Pwr. Co. (Atlanta)	0.47
Chicago (Ill.) Surface Lines	0.17
Chicago (Ill.) & Interurban Trac. Co	0.95
Indiana Service Corp. (Fort Wayne)	6.63
Union Traction Co. of Indiana (Anderson)	2.66
Tri-City Ry. Co. of Iowa (Davenport)	2.02
Cumberland County Pwr. & Lt. Co. (Portland, Me.)	1.10
United Rys. & Elec. Co. (Baltimore, Md.)	0.24
Berkshire St. Ry. (Pittsfield, Mass.)	6.50
Boston (Mass.) Elevated Ry	1.90
Eastern Massachusetts St. Ry. (Boston)	12.10
Massachusetts Northeastern St. Ry. (Haverhill)	1.65
Milford (Mass.) & Uxbridge St. Ry	4.00
Union St. Ry. (New Bedford, Mass.)	0.14
St. Cloud (Minn.) Public Service Co	0.25
City Light & Trac. Co. (Sedalia, Mo.)	1.00
Kansas City (Mo.) Lawrenceburg & Topeka Electric R.R	0.05
Missouri Elec. R.R. (St. Louis)	0.14
St. Joseph (Mo.) Ry., Lt., Heat & Pwr. Co	0.33
United Railways of St. Louis	0.02
Butte (Mont.) Elec. Ry	0.50
Lincoln (Neb.) Traction Co	2.50
Manchester (N. H.) St. Ry	0.02
Manchester (N. H.) & Derry St. Ry	0.05
Bridgeton (N. J.) & Millville Trac. Co	0.42
Millville (N. J.) Traction Co	0.84
Brooklyn (N. Y.) Heights R.R	0.09
International Ry. Co. (Buffalo, N. Y.)	0.27
New York State Rys. (Syracuse Lines)	0.21
Orange County Traction Co. (Newburgh, N. Y.)	0.50
Syracuse (N. Y.) & Suburban R.R	1.11
Westchester St. R.R. (White Plains, N. Y.)	1.50
Durham (N. C.) Traction Co	0.19
Cincinnati (O.) Traction Co	1.58
Columbus (O.) Ry. Pwr. & Lt. Co	0.19
Community Traction Co. (Toledo, O.)	2.79
Dayton (O.) Springfield & Xenia Southern Ry	2.00
Southeastern-Ohio Ry. (Zanesville)	1.00
Guthrie (Okla.) Ry	1.00
Northeast Oklahoma R.R. (Miami, Okla.)	0.66
Portland (Ore.) Ry., Lt. & Pwr	0.60
Beaver Valley Trac. Co. (New Brighton, Pa.)	0.81
Buffalo & Lake Erie Trac. Co. (Erie, Pa.)	0.57
Center & Clearfield Ry. (Philipsburg, Pa.)	0.50
Citizens Traction Co. (Oil City, Pa.)	0.54
Conestoga Traction Co. (Lancaster, Pa.)	0.03
Cumberland Ry. (Carlisle, Pa.)	15.00
Danville (Pa.) & Sunbury Transit Co	0.50
Easton (Pa.) Transit Co	7.27
Northwestern Pennsylvania Ry. (Erie, Pa.)	0.23
Philadelphia (Pa.) Rapid Transit Co	0.94
United Electric Rys. Co. (Providence, R. I.)	0.62
Dallas (Tex.) Ry. Co	1.31
Northern Texas Trac. Co. (Fort Worth)	0.11
Tarrant County Trac. Co. (Fort Worth, Tex.)	0.22
Richland-Ashland Ry. (Petersburg, Va.)	4.00
Puget Sound Elec. Ry. (Tacoma, Wash.)	0.13
Washington Water Pwr. Co. (Spokane, Wash.)	1.77
Yakima (Wash.) Valley Transp. Co	0.72
Morgantown (W. Va.) & Wheeling Ry. (entire line)	27.00
Milwaukee (Wisc.) Elec. Ry. & Lt. Co	2.53
British Columbia Elec. Ry. (Victoria, Can.)	0.40
Montreal (P. Q., Canada) Tramways Co	0.62
Oshawa (Ont., Canada) Ry	0.42
Total for 1921 (71 companies)	149.61

TABLE VII—SUSPENSIONS OF SERVICE 1921

(Includes miles of track on which companies have ceased to operate, but which have not been permanently abandoned or ripped up.)

	Miles
Eureka Trac. Co. (Eureka Springs, Ark)	4.00
Denver (Colo.) Tramways	25.00
Georgia Railway & Power Co	1.45
New Orleans (La.) Ry. & Lt. Co	0.77
Eastern Massachusetts St. Ry. Co	19.68
Middlesex & Boston St. Ry. (Newton)	6.44
Manistee (Mich.) Ry. (entire line)	7.64
Third Avenue Railway(New York City)	0.20
Belt Line Railway	8.83
Mid-Crosstown Ry	0.28
N. Y. City Interborough Ry	3.30
N. Y., Westchester & Conn. Trac. Co	0.01
Union Ry.of N. Y	14.22
Westchester Electric R.R	0.63
Yonkers R.R	0.01
Syracuse (N. Y.) & Suburban R.R	1.32
Community Traction Co. (Toledo, O.)	8.50
Southeastern-Ohio Ry. (Zanesville, O.)	1.00
Philadelphia Rapid Transit Co	4.42
Washington Water Power Co. (Spokane)	7.76
Monongahela Valley Trac. Co. (Fairmont, W. Va.)	2.27
Total for 1921 (14 companies)	117.73

The cumulative totals of all companies in receivership as of Dec. 31, 1920, and Dec. 31, 1921, are shown at the foot of Table V. This tabulation includes all the individual companies shown in last year's Table V, with the exception of the ones which were sold at foreclosure or completely abandoned during 1920. These were stricken from the list. To the list have been added the sixteen new receiverships which occurred during the year 1921, also the three companies mentioned in the note under Table I which should have been included in 1920, but were omitted because the data were not received in time. Certain minor changes and corrections also have been made in the various figures to bring them up to date due to more recent information received. The totals have been adjusted to bring them up to date in each case, and to correspond with the 1921 summaries in Tables I and II. The three companies, mentioned above, which emerged from receivership in 1920 without foreclosure, have been deducted from the final total of roads in receivership as of Dec. 31, 1921 (Table V), through the medium of the "net changes and corrections."

The lists of abandonments of parts of lines, and suspensions of service, Tables VI and VII, are the same in general appearance and character as last year. Several of the partial abandonments reported have occurred on lines which were extended to Army camps during the war period. In some cases service has been resumed on other lines which had been previously reported as having suspended service or having been abandoned. In several cities service was suspended during the past year owing to jitney competition and was again resumed when this competition was eliminated. A notable instance is the case of the city of Des Moines, where there was no electric railway service for a period of nearly three months.

There have been no total abandonments of any roads of considerable size. The largest was the Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio, which was sold for $60,000 and junked. The Fresno Interurban Railway reports that it has abandoned street railway passenger service, but is going to continue its freight business, therefore it has not been included in the list of abandonments.

Battle Waged Against Accidents

WITH the heading Efficiency—Safety—Courtesy, the *O. E. R. Bulletin* of the Ottawa (Ont.) Electric Railway is making a steady fight against accidents in Ottawa. The bulletin is issued only to the employees of the company and has in mind the promotion of good service. The publication serves as a means for frank discussion with the men of the problems and complaints that confront the officials.

Interests are not confined to local happenings nor to the problems of service maintenance only. In the November publication the problem of service-at-cost was presented in an article by Fielder Sanders, street railroad commissioner of Cleveland, Ohio.

The accident record of the Ottawa company is published each month, and for October the following statistics were given: Out of a total of ninety-three accidents, the company had no responsibility in seventy-six, doubtful responsibility in three, partial in one, and entire responsibility in thirteen. During September in ten cases the company was wholly at fault.

Electric Railway Statistics for 1921

Number of Operating Companies Has Increased by Seven, While Trackage Has Decreased 150 Miles and the Number of New Cars Has Failed by 304 to Equal the Number of Those Which Have Retired

CORRESPONDING with the statistics of the miles of track and type of rolling stock of the electric railway companies in the United States which was published on page 47 of the ELECTRIC RAILWAY JOURNAL for Jan. 1, 1921, there has been compiled from the August, 1921, "Electric Railway Directory" of the McGraw-Hill Company a similar table. This information was gathered for publication in the directory in June and July of last year and may be said to represent fairly statistics of electric railways as of July 1, 1921.

As will be noticed, the country has been divided into the usual sections which combine all the states into the five natural groups or sections. This enables an easy comparison of the trend of the industry from a statistical standpoint, not only for the United States as a whole but also for each section of the country.

Every attempt has been made to prevent duplication in compiling these figures. Often there is difficulty in determining the correct figures due to the fact that they are submitted from two separate sources, such as the operating company and the holding company, and which for some unknown reason do not always agree.

The total number of operating companies in 1921 shows an increase over last year. This is due to the fact that in some cases railways which had temporarily suspended service have again begun operation, while in others former underlying companies that had been held under long term leases are now functioning as separate organizations. However, the mileage in 1921 does not equal the total of 1919. The mileage has been reported as the single-track equivalent for the city and interurban companies, but for the electrified steam railroads their route mileage has been used. The mileage operated in 1921 shows a decrease over 1920 of 150 miles, the totals being 47,555 miles in 1921 and 47,705 miles in 1920. This is largely due, it would seem, to the practice of companies abandoning track in unprofitable territory or to the entire closing down of certain routes in the hands of receivers.

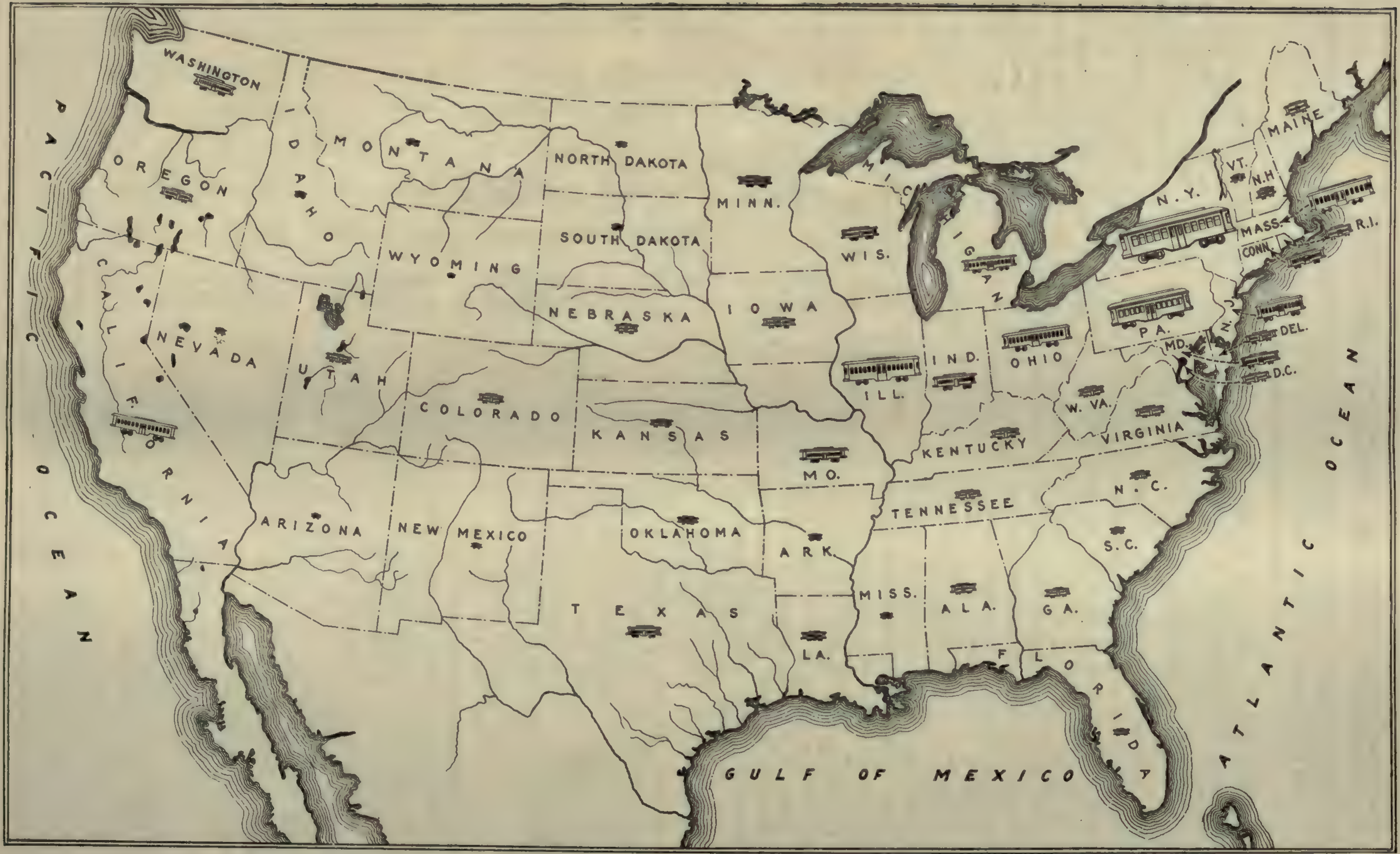
Total pieces of rolling stock have changed very slightly from a year ago. In 1920 the total number of cars and locomotives was 106,688, while in 1921 there were 106,384. This is a decrease of 304, which seems to indicate that new purchases as a whole are approximately equivalent to the equipment retired. These figures do not include 121 passenger motor buses, which have either taken the place of existing routes or have been used on new routes as feeders for the already existing railway lines.

The passenger cars are divided into motor and trailer classes. In examining the totals, the number of passenger motor cars has increased 300, while that of the passenger trailers has fallen off slightly more than 200. As will be noticed, there are variations in the totals for "freight cars," both motor and trailer; "service cars" and "other cars." Many companies in the past have considered these terms as interchangeable, and each year some additional reports are clarified. However, as it is the primary purpose of the table to show electric railway conditions throughout the country with regard to electrically operated equipment, companies having a larger number of trailer freight cars in comparison to their passenger equipment have had the former rolling stock omitted. Under this ruling the freight cars reported by the Northwestern Pacific Railroad, amounting to 1,481 cars; the Fort Dodge, Des Moines & Southern Railroad, with 2,405 cars; the Butte, Anaconda & Pacific Railway, with 1,458, and the Norfolk & Western Railroad, with 14,593 cars, have been omitted. The same is also true in the case of 3,000 "other" cars of the Chicago Tunnel Company. At the same time there have been included 1,157 freight cars of the Pacific Electric Railway and 910 such cars of

STATISTICS OF ELECTRIC RAILWAY CARS AND TRACK IN THE UNITED STATES

State	No. of Companies Operating	Miles of Single Track	Passenger Cars		Electric Locomotives	Freight and Express Cars		Service Cars	Other Cars
			Motor	Trailer		Motor	Trailer		
New England States:									
Connecticut...	7	1,562.42	1,739	52	108	60	8	289	1
Maine........	14	528.07	457	12	8	36	77	81	40
Massachusetts.	34	2,768.29	5,981	48	12	63	10	903	87
New Hampshire	11	249.90	299	....	1	1	....	22	14
Rhode Island..	4	399.97	1,055	30	3	31	41	167	5
Vermont......	8	103.33	126	4	4	11	1	12	5
Total.......	78	5,611.98	9,657	146	136	202	137	1,474	150
Eastern States:									
Delaware......	2	158.80	225	98	....	4	1	28	4
D. of Columbia	7	388.16	1,094	29	7	25	52	36	24
Maryland.....	11	705.00	2,052	59	11	5	49	29	38
New Jersey....	24	1,582.63	3,154	2	2	22	5	321	43
New York.....	91	5,616.30	18,351	1,979	125	132	38	1,275	942
Pennsylvania..	105	4,517.03	7,748	190	4	143	102	707	950
Virginia.......	13	442.88	863	64	3	16	32	50	5
W. Virginia....	17	692.94	618	24	15	35	22	50	45
Total.......	270	14,103.74	34,105	2,445	167	382	301	2,496	2,051
Central States:									
Illinois........	55	3,614.38	5,951	773	59	22	2,005	125	281
Indiana.......	28	2,452.71	1,997	61	12	43	458	134	221
Iowa..........	24	963.32	780	56	39	47	377	76	164
Kentucky.....	7	455.59	997	22	....	16	11	63	8
Michigan......	24	1,800.72	2,799	81	17	150	354	112	329
Minnesota.....	13	757.08	1,257	14	9	45	....	17	97
Missouri......	22	1,158.03	2,503	257	4	18	20	331	57
Ohio..........	60	4,214.34	5,089	594	32	192	342	538	259
Wisconsin.....	16	761.39	939	128	7	12	27	326	27
Total.......	249	16,177.56	22,312	1,986	179	545	3,594	1,722	1,443
Southern States:									
Alabama......	12	360.98	446	42	3	4	24	27	200
Arkansas......	9	128.30	243	10	....	....	4	10	24
Florida........	8	196.59	309	11	....	9	19	22	....
Georgia.......	11	478.71	674	46	1	5	19	49	31
Louisiana.....	8	309.20	666	47	....	8	1	108	2
Mississippi....	7	94.78	110	4	2	....	....	1	20
North Carolina	11	300.42	323	16	18	9	178	14	9
South Carolina	4	148.65	186	28	....	1	....	3	18
Tennessee.....	11	449.59	739	100	1	2	2	47	41
Total.......	81	2,467.22	3,696	304	25	38	247	281	345
Western States:									
Arizona.......	4	54.44	52	1	....	....	....	3	....
California.....	36	3,251.74	3,719	329	73	44	1,648	475	283
Colorado......	12	468.91	421	147	8	11	165	57	33
Idaho.........	3	102.20	35	....	....	25	....	8	....
Kansas........	14	514.69	369	39	2	17	95	27	26
Montana......	7	846.02	119	26	89	....	5	15	....
Nebraska......	5	256.00	610	10	1	....	....	3	50
Nevada.......	2	10.80	9	....	....	....	....	....	....
New Mexico...	2	10.95	16	....	....	....	....	....	....
North Dakota..	4	27.31	51	23	....	....	....	8	....
Oklahoma.....	17	369.53	320	20	7	3	96	22	9
Oregon........	8	694.13	716	103	23	....	459	166	35
South Dakota..	3	25.85	33	4	....	....	....	2	2
Texas.........	21	985.95	1,470	122	1	21	12	96	41
Utah.........	5	470.50	216	42	21	3	212	49	211
Washington...	15	1,083.71	1,097	70	28	33	741	77	71
Wyoming......	2	22.00	11	1	....	....	....	1	4
Total.......	160	9,194.73	9,264	937	253	157	3,433	1,009	765
Total U.S., 1921	838	47,555.23	79,034	5,818	760	1,324	7,712	6,982	4,754
Total U.S., 1920	831	47,704.92	78,722	6,027	751	1,215	7,441	5,723	6,809

Total number of cars and locomotives in 1921, 106,384; in 1920, 106,688



Graphical Presentation of Rolling Stock as Operated in the Several States During 1921

ON THIS map of the United States is graphically presented the information on rolling stock in the table on the opposite page. Each car shown has an area proportional to the amount of rolling stock in operation in that state. The number of cars in each state is probably a more accurate index of the size of the industry in that state than the track mileage, of which a map similar to this one was printed in the issue of the ELECTRIC RAILWAY JOURNAL for July 10, 1920. More than 20 per cent of the total rolling stock in the country operates in New York State. Pennsylvania, its nearest competitor, has less than half that percentage.

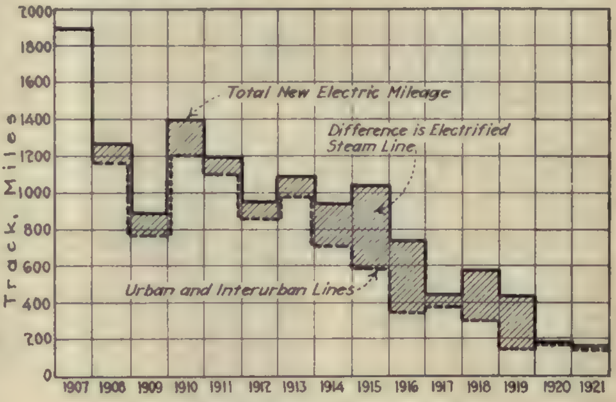
the Illinois Traction System, which are primarily electric railway systems that cover a large territory.

Corresponding with our policy of last year, an attempt has been made still further to unscramble the column "other" cars and allocate them according to their proper classifications. In 1919 we reported 10,144 "other" cars, in 1920 this was reduced to 6,899 and this year it is only 4,754 cars. While this is a decrease of 5,360 cars in two years, they have not all been discarded, but have been reported so as to be properly classified. It seems reasonable to suppose that heretofore "other" cars had included all types of equipment other than that engaged in passenger transport service. For this reason, then, as this class is more clearly detailed it is but natural to expect the numbers of service, freight and express cars will be increased.

Track Extended and Reconstructed in 1921

Amount of New Track Built During Past Year Remained About the Same as for 1919 and 1920—Track Reconstruction Has Taken a Sudden Jump and More Miles Have Been Rebuilt than Any Year Previously Recorded

A COMPARISON of the statistics of track built and reconstructed for the year 1921 as given in the accompanying tables indicates that electric railways have been unable to finance new construction, but that a large amount of reconstruction has been found necessary. The track extensions built by electric railways during the past year still continue at the low level that has existed since 1916. The mileage reported for urban and interurban track extensions during 1921 for the United States and Canada is 147.10. This is divided 108.15 miles for city lines and 38.95 miles for interurban lines. Practically all this is made up of spurs and short extensions and few additions of any considerable extent were carried out due to the extremely difficult conditions under which railways were working. The city of Detroit stands out as the only place where new construction was undertaken in any great amount. There 46.09 miles of new track were completed.



MILES OF TRACK BUILT BY YEARS

Electrification of steam lines was also at a standstill during the past year. The extensions reported amount to but 8.08 miles, which is nearly the same as for 1920.

New England District

	Extensions, Miles		Rebuilt, Miles	
	City	Interurban	City	Interurban
Connecticut				
The Connecticut Co. (New Haven)	0.40	0.05	12.81	5.02
Hartford & Springfield St. Ry.	.....	.....	1.10	....
Waterbury & Milldale Tramway	.....	.....	1.00	....
Maine				
Androscoggin Electric Co.	.....	.....	.....	3.00
Cumberland County Pwr. & Light Co.	.....	.....	2.29	1.12
Massachusetts				
Berkshire Street Ry.	.....	.....	1.66	0.33
Boston Elevated	0.80	.....	25.70	....
Boston & Worcester St. Ry.	.....	.....	0.57	....
Brockton & Plymouth St. Ry.	.....	.....	1.00	....
Connecticut Valley St. Ry.	.....	.....	0.50	....
Eastern Massachusetts St. Ry.	.....	.....	5.30	4.40
Holyoke Street Railway	.....	.....	0.86	1.11
Middlesex & Boston St. Ry.	.....	.....	0.44	1.64
Milford & Uxbridge St. Ry.	.....	.....	.....	4.00
Northern Massachusetts St. Ry.	.....	.....	2.00	....
Springfield Street Ry.	.....	.....	1.06	0.73
Union Street Ry.	0.01	4.96	0.47	0.05
Worcester Consolidated St. Ry.	0.34	.....	3.04	0.44
Rhode Island				
United Electric Rwys.	.....	.....	3.52	....
Vermont				
Barre & Montpelier Trac. & Pwr. Co.	.....	.....	0.10	....
Total	1.55	5.01	63.42	21.84

North of the Ohio and East of the Mississippi River

	Extensions, Miles		Rebuilt, Miles	
	City	Interurban	City	Interurban
District of Columbia				
The Capital Traction Co.	.....	.....	3.07	....
Washington & Old Dominion Ry.	.....	.....	.....	1.00
Washington Railway & Elec. Co.	.....	.....	5.50	....
Delaware				
Wilmington & Philadelphia Trac. Co.	.....	.....	2.76	....
Illinois				
Alton, Granite & St. Louis Trac. Co.	.....	.....	1.76	....
Bloomington & Normal Ry. & Lt. Co.	.....	.....	1.00	....
Calumet & So. Chicago Ry.	.....	.....	0.05	....
Chicago City Ry.	0.01	.....	0.22	....
Chicago & Interurban Trac. Co.	.....	.....	1.00	15.00
Chicago Railways	1.80	.....	2.40	....
Coal Belt Elec. Ry.	.....	.....	0.34	....
East St. Louis Ry.	.....	.....	2.15	....
East St. Louis & Suburban Ry.	.....	.....	0.52	....
Evanston Ry. Co.	.....	.....	2.60	....
Illinois Central Elec. Ry	.....	.....	0.11	....
North Kankakee El. Light & Ry. Co	.....	.....	2.00	....
Peoria Ry. Co.	.....	.....	1.31	....
Peoria Ry. Terminal Co.	.....	.....	1.60	....
Sterling, Dixon & Eastern El. Ry.	.....	.....	1.00	....
St. Louis & Belleville El. Ry.	.....	.....	0.50	....
Indiana				
Chicago, South Bend & No. Ind.	.....	.....	0.71	....
Gary Street Ry.	.....	.....	3.75	....
Hammond, Whiting & E. Chicago Ry.	.....	.....	0.23	....
Indiana Service Corporation	2.16	0.15	1.32	0.45
Southern Indiana Gas & Electric Co.	.....	.....	0.75	....
Southern Michigan Ry.	.....	.....	0.25	....
Terre Haute Traction & Lt. Co.	.....	.....	1.00	....
Union Traction Co. of Indiana	0.27	.....	0.90	....
Maryland				
Baltimore & Bel-Air Elec. Ry.	.....	0.50	.....	....
United Rwys. & Elec. Co.	1.77	.....	15.24	...
Michigan				
Benton Harbor-St. Joe Ry. & Lt. Co.	0.50	.....	1.50	....
City of Detroit Dept. of Street Rwys.	46.09	.....	.....	....
Grand Rapids Ry.	0.31	.....	1.17	....
Ironwood & Bessemer Ry. & Lt. Co.	0.20	.....	.....	....
New Jersey				
Burlington County Transit Co.	.....	.....	2.50	....
Jersey Central Traction Co.	.....	.....	0.50	....
Monmouth County Electric Co.	.....	.....	0.15	....
Public Service Ry.	.....	.....	17.68	....
New York				
Black River Traction Co.	.....	.....	0.24	....
Brooklyn City R.R.	.....	.....	4.75	....
Eighth Ave. R.R.	.....	.....	1.00	....
Elmira Water, Light & R.R. Co.	.....	.....	0.80	....
Empire State R.R.	.....	.....	0.71	....
Fonda, Johnstown & Gloversville R.R.	.....	.....	0.34	....
International Ry.	.....	.....	14.44	....
New York State Rwys.	0.06	.....	2.79	....
Ninth Ave. R.R.	.....	.....	0.75	....
Port Jervis Traction Co.	.....	.....	0.25	....
Rochester, Lockport & Buffalo R.R.	.....	.....	1.40	....
Schenectady Ry.	.....	.....	0.85	....
Southern New York Power & Ry. Corp.	.....	.....	0.11	....
Syracuse & Suburban R.R.	0.14	.....	0.65	....
Third Avenue Ry.	0.07	.....	16.50	....
United Traction Co.	.....	.....	1.95	....
Wallkill Transit Co.	.....	.....	0.25	....
Waverly, Sayre & Athens Trac. Co.	.....	.....	0.50	....
Western New York & Penna. Trac. Co.	.....	.....	2.00	12.00
Ohio				
Cincinnati & Dayton Traction Co.	.....	.....	1.00	3.00
Cincinnati Traction Co.	2.15	.....	9.32	....
City Railway	2.00	.....	.....	....
Columbus Railway, Power & Lt. Co.	0.16	.....	4.07	3.59
Community Traction Co.	.....	.....	1.72	....

(*Continued on Page 44*)

Ohio (Continued from Page 43)

	Extensions, Miles		Rebuilt, Miles	
	City	Interurban	City	Interurban
Cleveland & Eastern Traction Co.	.....	.....	.....	1.50
The Cleveland Railway	1.50	.....	26.81	....
Dayton & Western Traction Co.	.....	0.38	.....	....
Lancaster Traction & Pwr. Co.	.....	.....	0.32	....
Northern Ohio Traction & Lt. Co.	2.38	.....	1.23	....
Ohio River Electric Ry. & Power Co.	.....	.....	.....	0.25
Pennsylvania & Ohio Traction Co.	.....	.....	0.42	....
Pennsylvania-Ohio Electric Co.	.....	.....	0.61	0.40
Richland Public Service Co.	.....	.....	0.72	....
Toledo, Fostoria & Findlay Ry.	.....	.....	1.00	6.00
Youngstown Municipal Ry.	.....	.....	5.28	....
Pennsylvania				
Allegheny Valley St. Ry.	.....	.....	0.74	....
Altoona & Logan Valley Elec. Ry.	1.00	.....	0.50	....
Beaver Valley Traction Co.	.....	.....	0.22	....
Buffalo & Lake Erie Traction Co.	1.29	.....	2.20	3.46
Center & Clearfield Ry.	.....	.....	.....	0.50
Citizens Traction Co.	.....	.....	0.61	....
Conestoga Traction Co.	.....	.....	0.93	0.03
Danville & Sunbury Transit Co.	.....	0.19	.....	....
Eastern Pennsylvania Rwys.	0.20	.....	1.50	1.00
Frankford, Tacony & Holmesburg St. Ry.	.....	.....	2.50	....
Harrisburg Railways	.....	.....	0.50	....
Johnstown & Somerset Ry.	.....	5.00	.....	....
Johnstown Traction Co.	.....	.....	1.25	....
Northampton, Easton & Washington Tract. Co.	.....	.....	.....	1.00
North Branch Transit Co.	.....	.....	0.85	....
Northeastern Pennsylvania Ry.	.....	.....	0.33	....
Philadelphia Rapid Transit Co.	0.68	.....	10.26	....
Pittsburg Railways	.....	.....	15.00	....
Reading Transit & Lt. Co.	0.41	.....	2.80	12.50
Schuylkill Railway Co.	.....	.....	1.50	3.00
Scranton Ry. Co	.....	.....	1.46	....
Susquehanna Traction Co.	.....	.....	0.50	....
Valley Rwys.	.....	.....	.....	0.50
West Chester St. Ry.	.....	.....	1.00	....
West Penn Rys.	.....	.....	5.34	....
Total	65.15	6 22	230.31	65.18

South of the Ohio and East of the Mississippi River

	Extensions, Miles		Rebuilt, Miles	
	City	Interurban	City	Interurban
Alabama				
Alabama Power Co.	..	....	2.00	....
Mobile Light & R.R. Co.	.	....	0.30	....
Montgomery Light & Traction	2 00	.....	.....	....
Florida				
Jacksonville Traction Co.	0.09	....	0.29	....
Key West Electric Co.	.....	.....	0.31	....
Miami Traction Co.	.....	.....	5.00	....
Tampa Electric Co.	0.18	. .	2.50	....
Georgia				
Athens Ry. & Elec. Co.	.....	.. ..	0.87	....
Columbus R.R.	...	.....	1.48	....
Georgia Ry. & Pwr. Co.	0 53	.....	3.56	....
Rome Ry. & Lt. Co.	.....	.....	0.50	....
Savannah Electric Co.	1.93	. ..	.. ..	....
Valdosta St. Ry.	.....	.. ..	1.00	....
Kentucky				
Kentucky Traction & Terminal Co.	.....	.. .	0.74	....
South Covington & Cincinnati St. Ry.	1.11	.. ..	0.15	...
Louisiana				
New Orleans Railway & Lt. Co.	0.45	..	8.00	....
Orleans-Kenner Traction Co.	.....	11.37	.....	....
Mississippi				
Laurel Lt. & Ry. Co.	.. .	....	2.00	7.00
Vicksburg Lt. & Traction Co.	.....	.....	4.00	....
North Carolina				
Durham Public Service Co.	0.18	. ..	1.10	....
Tidewater Power Co.	.....	. ..	1.00	1.00
Southern Public Utilities Co.	.....	.. .	0.75	....
Tennessee				
Citizens Ry.	.....	.....	1.65	....
Knoxville Railway & Lt. Co.	.....	. ..	0.76	....
Memphis Street Ry.	0.15	.....	6 15	....
Virginia				
Danville Trac. & Pwr. Co.	.....	.. ..	2.00	....
Newport News & Hampton Ry., Gas & Elec. Co.	.....	.....	0.25	....
Richmond & Fairfield El. Ry.	.....	0.50	.....	....
Virginia Ry. & Pwr.	1.11	.....	4.91	....
West Virginia				
Charleston-Dunbar Traction Co.	0.20	.....	0 75	....
Charleston Interurban R.R.	0.25	1.00	2.00	....
Monongahela Power & Rwy. Co.	.....	0.20	1.10	....
Princeton Power Co.	1.25	.. ..	....	....
Total	9.43	13.07	55.12	8.00

West of the Mississippi River

	Extensions, Miles		Rebuilt, Miles	
	City	Interurban	City	Interurban
Arkansas				
Fort Smith Lt. & Traction Co.	.....	.....	1.50	....
Southwestern Gas & Electric Co.	.....	.....	1.00	....
California				
Los Angeles Ry. Corp.	.....	.....	16.30	....
Pacific Electric Ry.	.....	.....	7.22	5.83
Pacific Gas & Electric Co.	0.08	.....	1.00	....
Peninsular Ry.	0.05	0.01	.... .	2.50
Petaluma & Santa Rosa R.R.	.....	0.48	.....	....
San Diego Elec. Ry.	.....	.....	1.00	....
San Francisco, Napa & Calistoga Ry.	.....	.....	0.36	1.18
San Francisco-Oakland Terminal Rys.	1.32	0.04	2.70	....
Visalia Electric R.R.	.....	0.24	.....	1.50
Colorado				
The Denver Tramway	.....	.15	13.50	....
The Western Lt. & Pwr. Co.	.....	.....	1.00	....
Iowa				
Iowa Railway & Lt. Co.	.....	.....	0.21	....
Keokuk Electric Co.	.....	.....	0.10	....
Mason City & Clear Lake R.R.	.....	.....	0.72	....
Ottumwa Ry. & Lt. Co.	.....	.....	0.50	....
Tama & Toledo R.R.	.....	.....	0.19	....
Minnesota				
Duluth Street Ry.	1.24	.....	.....	....
Mesaba Ry.	.....	.....	.....	8.60
Twin City Rapid Transit Co.	4.61	0.15	6.16	....
Missouri				
Cape Girardeau-Jackson Interurban Ry.	.....	.....	4.50	....
City Light & Traction Co.	1.88	.....	.....	....
Kansas City, Lawrence & Topeka Elec. R.R.	.....	.....	.....	1.50
Kansas City Rwys.	.....	0.40	.....	....
Missouri Electric R.R.	.....	0.01	.....	5.27
St. Joseph Ry., Light, Heat & Pwr. Co.	.....	.....	0.51	....
United Rwys. Co. of St. Louis	0.05	0.05	26.41	1.45
Nebraska				
Lincoln Traction Co.	0.33	.....	0.33	....
Omaha, Lincoln & Beatrice Ry.	.....	0.50	.....	.. .
Omaha & Council Bluffs St. Ry.	.....	.....	6.00	....
North Dakota				
Grand Forks Street Ry.	....	.....	0.61	....
Oklahoma				
Northeast Oklahoma R. R.	.....	5.00	.....	....
Oklahoma Ry.	3.00	.....	3.00	....
Pittsburgh County Ry.	.....	.....	.....	1.00
Tulsa Street Ry.	.....	.....	1.86	....
Oregon				
Pacific Power & Lt. Co.	.....	.....	0.38	....
Portland Ry., Lt. & Pwr. Co.	0.03	2.39	3.88	....
Texas				
Dallas Ry.	1.90	.....	.....	....
El Paso Elec. Ry.	0.87	.....	.....	...
Galveston Elect. Co.	.....	.....	1.00	. .
Northern Texas Tract. Co.	2.32	0.92	.....	....
San Antonio Public Service Co.	.....	.....	1.91	...
Wichita Falls Traction Co.	1.50	.....	.....	...
Utah				
Bamberger Electric R.R.	.....	3.30	.....	....
Washington				
Seattle Municipal Ry.	3.97	.....	.....	....
Seattle & Rainier Valley Ry.	.....	.....	3.00	.. .
Washington Water Pwr. Co.	.....	.....	0.87	....
Yakima Valley Transportation Co.	0.04	0.11	.....	....
Wisconsin				
Milwaukee Electric Ry. & Lt. Co.	2.43	0.43	8.10	1.20
Total	25.62	14.18	115.82	30.03

Outside the United States

	Extensions, Miles		Rebuilt, Miles	
	City	Interurban	City	Interurban
Canada				
Brantford Municipal Ry.	2.31	.....	1.02	....
British Columbia Elec. Ry.	0.55	0.07	0.76	....
Cornwall St. Ry. Lt. & Pr. Co.	.....	.....	0.33	....
Hull Electric Co.	.....	.....	1.00	...
Lethbridge Municipal Ry.	.....	.....	3.00	....
Montreal Tramways	2.62	.....	13.48	....
Niagara, St. Catharines & Toronto Ry.	.....	0.40	3.70	1.20
Quebec Ry. Light, Heat & Pwr. Co.	0.10	.....	.....	...
Saskatoon Municipal Ry.	0.49	.....	.....	....
Winnipeg Electric Ry.	0.33	.....	1.00	....
Total	6.40	0.47	24.29	1.20

The fact that electrified steam lines have added very little new mileage during the past two years makes a comparison with totals for previous years seem very low.

While track extensions have not been made, track forces have not been idle, as is indicated by the large amount of reconstruction carried out. The number of railways reporting reconstruction of their tracks the past year is 184 and they report a total of 615.21 miles as reconstructed. This is greater than any year since we began compiling this information, the largest amount previously reported being for the year 1919, when 390.64 miles was reconstructed.

An accompanying chart and table give a comparison

SUMMARY OF TRACK CONSTRUCTION—1921

	New England District	North of the Ohio and East of the Mississippi	South of the Ohio and East of the Mississippi	West of the Mississippi	Total United States	Canada	Total
TRACK EXTENSION							
Number of companies	[illegible]	26	16	25	71	7	7[illegible]
Miles of track:							
Urban	1.55	65.15	9.43	25.62	101.75	6.[illegible]	108.15
Interurban	5.01	6.22	13.07	14.18	38.48	[illegible].47	38.95
Total track extended	6.56	71.37	22.50	39.80	140.23	6.87	147.10
TRACK RECONSTRUCTION							
Number of companies	20	91	28	37	176	8	184
Miles of track:							
Urban	63.42	230.31	55.12	115.82	464.67	24.29	488.96
Interurban	21.84	65.18	8.00	30.03	125.05	1.[illegible]	126.25
Total track rebuilt	85.26	295.49	63.12	145.85	589.72	25.49	615.21

COMPARISON OF TRACK CONSTRUCTION

Year	Extensions No. of Companies	Urban Track	Interurban Track	Electrified Steam Lines	Total	Track Rebuilt
1907	(a)	(a)	(a)		1,880 00	(a)
1908	157	1,174 5		84.00	1,258.50	(a)
1909	160	774.7		112.40	887 16	(a)
1910	217	1,204.8		192.40	1,397.20	(a)
1911	223	1,105.0		86.50	1,191.50	(a)
1912	171	869.4		80.80	950.20	(a)
1913	181	974 9		119.00	1,093.90	( )
1914	163	716.5		229.00	946.40	(a)
1915	136	596.0		448 20	1,044.20	(a)
1916	104	115.40	240 90	388.00	744.30	(a)
1917	121	251 10	125 60	66.00	442.70	375.40
1918	80	216.41	97.41	275.70	589.53	155.43
1919	73	110.90	29.67	287.60	428 17	390.64
1920	87	145.69	30.87	8.92	185.48	361.77
1921	78	108.15	38.95	8.08	155.18	615.21

(a) Not available.

of new track extensions by years since 1907. The shaded area in the chart represents the amount of electrified steam line extensions, which has dropped to almost nothing during the last two years but which gives every indication of becoming greater than ever in the next few years. In the table the mileage for track extensions has been separated between urban and interurban service since 1916. Previous to that date information for such a segregation was not available.

The single track mileage for extensions and reconstruction is given by individual companies in the large table. Following our usual practice the various railways are alphabetically grouped by states and the states into five geographical districts to correspond with other similar tables in this issue. The group north of the Ohio and east of the Mississippi river has built more extensions and rebuilt more track than any of the other groups. This is quite logical as this district includes the greatest amount of electric railway mileage. The information for this table was prepared from replies to a questionnaire sent to all railways in the United States and Canada. Approximately 750 companies replied.

New York State has the largest mileage for track rebuilt, with nineteen companies reporting a total of 62.28 miles reconstructed. Eight companies from Canada report 25.49 miles of track reconstructed.

ELECTRIFIED STEAM LINES

	Extensions, Miles
New York, New Haven & Hartford R.R.	0.19
New York, Westchester & Boston	3.56
Northeast Oklahoma R.R.	4.00
The Oshawa Railway (Canada)	0.31
Niagara Junction Railway	0.02
Total	8.08

No reconstruction of track reported.

Proper Illumination Attracts Passengers*

A Light Interior Finish, Correctly Designed Reflectors and Proper Outlet Spacing Produce in Combination an Attractively Lighted Car

By J. A. SUMMERS

Assistant Illuminating Engineer, General Electric Company, Harrison, N. J.

BUSINESS men have found that light draws trade. This has been so definitely proved that few would attempt to contradict it. We see the results on every side; the crowd gathers where the bright lights are; they stop and examine the brightly lighted show windows; they drift unconsciously to the brightly lighted theater entrance or restaurant. If street cars are made bright and attractive it is perfectly logical to assume that human nature will react in the same manner with regard to them as it does to brilliant illumination in other places.

That the public does react in this manner was definitely shown recently in the subway in New York. On some of the local trains alternate cars had about 25 per cent more light than the others and it was observed that the brighter cars were occupied before the others. Experiences of this kind indicate that it is entirely logical to apply merchandising methods to attract passengers.

I have heard some say that it is not necessary to attract passengers. This may be true in some cases, but in the large majority of cases the electric railways are exerting every effort to attract the public to their cars. The profits of a company depend largely on the number of people who can be induced to ride who are not forced to ride. Brightly lighted cars are without question a powerful aid in attracting these casual riders, and hence the proper illumination of cars should receive very serious consideration.

There are a great many variables to be considered in planning the lighting of a car. The interior finish of the car, the voltage regulation, arrangements of the seats and the standard of lighting in the community have a very decided bearing on the selection of the proper lighting equipment. The interior finish makes a great difference in the resulting illumination. This is true regardless of the reflector equipment. A car with a dark finish is likely to appear dark even though the photometer shows that the illumination is adequate. The psychological effect of such a car is depressing and the passengers feel that there is insufficient illumination, hence the unjust criticism. A gloomy car also suggests uncleanliness and frequent resentment is expressed by passengers because of being compelled to ride on "dirty, gloomy cars." This feeling does considerable harm to the railways not only by causing the antagonism of the public but by repelling the short-haul passenger.

A flat white ceiling with light color woodwork is of course most desirable from an illumination standpoint, but a light tinted ceiling, which many companies prefer, is quite satisfactory. Such a finish will add 20 to 40 per cent to the illumination secured with the dark green ceiling so often seen, and naturally the car will appear much brighter and more cheerful. If a gray tint is used, the paint should be mixed with vermillion and emerald green and reduced with white until the proper tint is secured. A gray that is mixed with lamp black has a much higher absorption than a warm gray mixed as above.

The shape of the ceiling also has a decided bearing on the illumination. The arch roof is a much better arrangement from a lighting standpoint because the light is not bottled up in the clearstory. This arrangement also provides better light on the advertising cards.

The amount of light necessary and the arrangement of the outlets are matters that have received considerable attention and aroused a great deal of discussion. It is a relatively simple matter to state the minimum requirements for safety and for reading without eye strain, but this does not really satisfy the conditions from an economic standpoint. The standard of lighting in offices, stores and industrial plants has increased materially in the last few years and this naturally influences the public's demand for higher intensities in street cars.

An average of 3.5 to 4.0 foot-candles in a car was considered very good lighting several years ago, while now there is a strong tendency to go to at least 10 foot-candles and even higher so as to conform to the new industrial standards. This is not an unreasonable intensity, and can easily be secured with proper reflectors with an expenditure of power of about 2 watts per square foot of floor area.

One must not forget the fact that the 10 foot-candles measured in an empty car at rest and with lamps operating at normal voltage will be reduced to not over 6.0 foot-candles when the car is crowded and the voltage lowered as much as it is on the majority of electric lines. The cross reflection which adds up in the empty car is also entirely absorbed in a crowded car, and due allowance should be made for this fact when estimating the desired intensity.

A much higher intensity is necessary to read comfortably in a railway car than in a home or office, because the vibration and jolts of a rapidly moving car cause a rapid movement of the reading matter which is hard to follow without great eyestrain under low intensities. Many tests on the speed of vision have shown that an intensity of 10-foot candles is necessary to read rapidly changing print.

One row of lamps on the center line of the car is the most economical way of placing the units, and an illumination test in an empty car would show a satisfactory distribution of light. The results are also fairly satisfactory to the passengers if the seats are arranged across the car. In this case the standing passengers do not cast objectionable shadows on the seated passengers. However, if the seats are arranged longitudinally the results are often unsatisfactory whenever there are standing passengers. The arms and hands holding on to the overhead straps effectually prevent the light from reaching the seated passengers. In the latter case, therefore, use should be made of two lines of units, placed just inside the edge of the seats. In all cases medium density opal reflectors should be used and in no case should they be spaced more than 5 ft. apart. If the units are placed under the clearstory it is of prime importance to use reflectors as a standing passenger is so close to the lamps that to him an unshaded lamp is exceedingly annoying. Exposed lamps in this position also detract from the advertising value of the cards under the half-deck because of the glare.

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*Abstract of a paper presented before the New York section of the Illuminating Engineering Society.

Many accidents have occurred to passengers alighting from cars because of inadequate light at the steps. Persons are temporarily blinded when going from a brightly lighted platform to the dark steps and many serious falls have resulted. Several methods have been satisfactorily tried to solve this problem. One is to utilize one circuit just inside the door to operate when the door opens. Another method is to set a lamp in a recess at each end of the step, each lamp operating in series with the circuits inside the car. The latter method is the better one when the construction of the car permits its use.

The principal points to consider in designing the illumination of a car, either new or when remodeling, is the value of a light finish on the ceiling, the use of a proper reflector, spacing of the lamps not to exceed 5 ft., and an intensity high enough not only to make comfortable reading but to attract passengers to a well-lighted car.

Mid-Winter Meeting of New York Electric Railway Association

THE program for the technical sessions of the mid-winter meeting of the New York Electric Railway Association has now been completed by the committee of subjects, of which B. E. Tilton, vice-president New York State Railways, Syracuse Lines, is chairman. The meeting will be held at the Astor Hotel on Jan. 24 and will include a morning and an afternoon session with a banquet in the evening.

At the technical sessions three papers will be presented as follows:

1. "One-Man Car Operation with Double-Truck Cars," by H. S. Sweet, master mechanic New York State Railways.
2. "Workman Compensation Plan as a Continuing and Increasing Liability to Electric Railway Companies," by Martin E. Burke, assistant general attorney Interborough Rapid Transit Company, New York.
3. "One Year's Experience with the Service-at-Cost Plan in the City of Rochester," by Charles R. Barnes, street railway commissioner of the city of Rochester.

It is expected that a great deal of interesting and valuable information will be brought out in these papers. Each speaker is an authority on the subject to be treated by him. Mr. Sweet has recently designed for the company with which he is connected a car of the type he will undoubtedly describe in his paper, and it is said to be giving very good satisfaction. Mr. Burke has entire charge on the system with which he is connected of the legal side of the application of workmen's compensation. The paper and resulting discussions will undoubtedly bring out the increasing value of safety campaigns and proper instruction of employees. Mr. Barnes was for many years electrical expert for the New York State Public Service Commission, Second District, but became street railway commissioner of the city of Rochester when the service-at-cost franchise was put in force there a little more than a year ago.

There will be the usual dinner in the evening. It will also be held at the Astor, and among the speakers will be Hon. Fred S. Purnell, member of Congress from Indiana. His topic will be: "The Turn of the Tide in American Problems of Today." The banquet committee has also secured the presence and services at the banquet of the male quartet whose songs proved most popular at the Lake George meeting.

Congress Wants to Know

THE joint Congressional committee which is conducting a very comprehensive investigation of the economic situation surrounding agriculture recently called upon the American Electric Railway Association for detailed information with regard to electric railway rates and a long list of other questions which would have involved the sending of a questionnaire to every company in the country. Since the electric railways transport an insignificant proportion of farm products, Chairman C. L. Henry of the national relations committee, and James W. Welsh, executive secretary of the association, went to Washington to inquire of the committee if it would be benefited particularly by the information in the form requested. After listening to Messrs. Henry and Welsh, the committee modified its request and will ask only for a general statement by Mr. Henry on the relationship between electric railway operation and the agricultural industry.

American Association News

Executive Committee Meeting

THE executive committee of the American Electric Railway Association met at the headquarters office in New York on Friday, Dec. 30.

There were the usual routine reports of the executive secretary and of some of the committees by means of which the executive committee is kept in touch with the active management of the association.

The subjects and meetings committee, C. D. Emmons, chairman, reported the program for the mid-year conference at Indianapolis as given in last week's issue of the ELECTRIC RAILWAY JOURNAL. In addition to the program it announced, Mr. Emmons reported that there would be an attempt made to have an address on "A Woman's Viewpoint on Electric Railways and Electric Railway Service" by some woman the committee would invite for the purpose.

The committee on publications, L. S. Storrs, chairman, reported progress. It announced the resignation of Henry Surguy as editor of *Aera*, stating that the position had not yet been filled. Mr. Storrs also stated that the committee was also working on a definite announcement to the association as to how *Aera* as an association publication could be made more useful.

The committee on company membership reported the following new associate members: Ford, Bacon & Davis, United Gas Improvement Company, American Light & Traction Company and A. S. Richey, consulting engineer; and the following operating company: Montgomery (Ala.) Light & Traction Company.

The president was authorized to appoint the usual committee on the location of the 1922 convention. This committee was asked to make recommendations in regard to having exhibits.

The question of a vote for or against the American valuation policy in the tariff as contained in the National Chamber of Commerce referendum was presented by Mr. Storrs, the association's counsellor. The executive committee authorized a vote for the American valuation plan.

The question of the association taking some action to evolve a standard method of classification of employees in order to make easier the comparisons of the wages and other statistics between the different companies was brought up. The executive committee referred the question to the executive committees of the Engineering and Transportation & Traffic Associations, with a recommendation that a joint committee on this question be appointed. The question of expenses of committee members of all the associations was brought up and referred to the finance committee, with a request for a report and recommendation at the January meeting.

On account of the fact that the fourth Friday of January conflicted with the annual meeting of the Central Electric Railway Association, it was decided to hold the January meeting of the executive committee on Jan. 20, in New York.

Those present at the meeting on Dec. 30 were President R. I. Todd, Vice-President C. D. Emmons and J. N. Shannahan, Past-Presidents L. S. Storrs, John Stanley and C. L. Henry; L. H. Palmer, president affiliated association; R. P. Stevens, W. H. Sawyer and P. S. Arkwright, operator members-at-large; C. R. Ellicott, L. E. Gould, S. M. Curwen, manufacturer members; Treasurer B. G. Collier, and Executive Secretary J. W. Welsh.

Education Committee Busy

AN AMBITIOUS program was blocked out by the committee on education at its meeting held in New York City on Jan. 3. Some details of this will be given in a later issue. The co-operation of the industry will be asked in order that the most effective possible use of the committee's efforts may be made.

The committee on education members and visitors present included Edward Dana, chairman; M. B. Lambert, E. A. West, F. R. Phillips, William Von Phul, E. J. Blair, A. E. Potter, C. S. Coler and W. H. Timbie.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

12 per Cent Wage Cut

Employees at St. Paul and Minneapolis Reduced Following Restraining Order on Higher Fare

Employees of the electric railways in St. Paul and Minneapolis, Minn., experienced a 12 per cent cut in wages beginning Jan. 1, 1922. This was announced by the companies immediately following the permanent injunction restraining the St. Paul City Railway from putting into effect the 7-cent fare ordered by the State Railroad & Warehouse Commission. The decision was made on Dec. 28 by Judge F. M. Catlin in the Ramsey District Court. The cut affected 4,200 men, of which number 2,300 are trainmen. This cut practically returns the men to the status before the advance of July, 1920.

A conference of trainmen was called immediately following the decision, or six committees from six stations. The chairmen issued statements of confidence that the men would accept the cut. President Horace Lowry explained the cut was a direct result of the failure of the St. Paul company to obtain relief in the district court through an increase in fare of 1 cent.

Wages of trainmen will be as follows: First year of service, 40 cents an hour; second year, 51 cents; third year and after, 53 cents. Vacations will be unchanged. Overtime is at the rate of 10 cents an hour extra over nine hours. Wages were 55, 58 and 60 cents.

Frank Wagner for the men said:

> The men realize the situation of the company. They are prepared to accept the 12 per cent cut without controversy. Conditions are satisfactory to them and they are willing to make necessary sacrifices to keep the lines operating.

President Lowry said in part:

> During July, 1920, the wages of employees of this company were increased 20 per cent and the company was authorized to collect a 6-cent fare, but because of the increased expenses due to the increased payroll and increased service, the net earnings of the company have constantly decreased so that the margin of safety is now wiped out and the owners of the property are not receiving a fair return on the money invested in the property.
>
> When the increase in fare and wages was made, your management knew the company would lose money by the process, but felt that in time the company would receive higher fares or that operating expenses would fall, and it now believes living costs have so declined that it is justified in lowering wages in order to reduce operating costs.
>
> The company has many obligations imposed upon it as a public service corporation, among which the following should receive first consideration:
>
> To render a good public service.
>
> To pay a fair wage to its employees.
>
> To pay to its stockholders a reasonable return on the fair value of their property.
>
> The company has made every reasonable and possible effort to obtain relief through an increase in fares, but has met with constant delays through governmental proceedings and legal attacks, and there is no prospect of immediate relief for the company.
>
> Even though the company secured the 1-cent increase in fare, it would not be sufficient to meet its actual needs although it is all the company asked for in its application to the railroad commission for a temporary fare of 7 cents cash, four tokens to be sold for 25 cents. The company hoped that the granting of this temporary fare would prevent a receivership for part of its property pending the final valuation of the property by the commission and the establishment of a rate based thereon.
>
> In most of the cities above named where wages have been reduced a higher rate of fare is being collected on the street cars than in either Minneapolis or St Paul.
>
> The management of this company believes the public generally is willing to pay a reasonable fare for street railway transportation when it believes that the property is operated under an efficient management, but that it has a right to expect the company to keep its payroll in line with prevailing wages.
>
> In view of the above facts and considering the financial condition of the company, the management finds it necessary to make a reduction in wages of approximately 12 per cent.

Seattle Reply Brief

In its suit against the city of Seattle, called "specific performance suit," the Puget Sound Power & Light Company has filed its reply brief. The case has already been heard before Federal Judge E. E. Cushman, but the points and authorities of the litigants are still being filed with the court.

If the suit is decided in the manner desired by the Stone & Webster interests, it is pointed out, the city will thereafter be obliged to pay interest and principal on the $15,000,000 bonds out of gross revenues first, and to pay the cost of operation and maintenance of the railway system out of the general tax fund, if the revenues were not sufficient to pay both.

In this case, the Stone & Webster interests are seeking to have the Federal Court take jurisdiction over the traction system, and also to make the charges of interest and principal on the $15,000,000 bonds superior to the charges of operation and maintenance.

The city contends that there is no controversy existing between the parties to the suit, and asks that the action be dismissed without prejudice.

In their reply, Stone & Webster submit the following:

> 1. That the city is bound to pay the cost of operation and maintenance out of its general fund in case the gross revenues are insufficient to pay the bonds with interest, and also the cost of operation and maintenance.
> 2. That the city is bound to operate the railway until the bonds with interest shall be paid even if the cost of operation and maintenance must be paid out of the general fund.
> 3. That the plaintiff is entitled to a decree so adjudging.

In another part of this brief, it is stated, that "the plaintiff seeks to have its rights under the bonds and ordinances and the obligation of the city with respect thereto determined is only natural."

Date for hearing of the suit of the fourteen taxpayers to prevent the city from delving into the general fund for the support of the municipal street railway has been set on the calendar of the Superior Court for January 10. In this case the point will be decided whether the entire gross revenues of the railway are pledged to payment of interest and principal of the $15,000,000 indebtedness to Stone & Webster or whether the bondholders are entitled only to what is left after the cost of operation and maintenance has been paid.

Elevated Proposal Rejected

Mono-Rail Project Turned Down by Council of Detroit—City Opposed to Elevated Construction

The matter of a proposed elevated line which the Michigan Elevated Railway sought permission to build in Detroit has been disposed by the City Council after about a year of delay. The petition has been denied by the Council. The engineers for the L-line appeared before the Council ready to go into details regarding the proposed line, which was to be a demonstration line, but were not permitted to explain their proposition in all of its various details.

MAYOR OPPOSED TO EXPERIMENT

Mayor Couzens had stated that he would abide by the decision of the Council and the Council had previously referred the matter to the Street Railway Commission. The Mayor later expressed his disapproval of any experimental lines and the Council was unanimous in its decision against the construction of a transportation system that is new in the country. The Michigan Elevated Railway proposed to install a transportation system utilizing mono-rail cars.

The company had asked permission to build on a day-to-day agreement with the provision that if the city decided it desired to proceed with that type of transportation after the experimental line had been completed, the company would allow the city to take over the line. Members of the Council were of the opinion that Detroit was not in need of an elevated railway and probably never would need it.

The State Supreme Court on Dec. 22 affirmed the right of the city of Detroit to build a double-track railway on Eliot Street, one of the streets traversed by the municipal crosstown line. The construction of the track was opposed and the legality of the street railway bonds questioned by residents of Eliot Street. The case was decided in favor of the city in the lower court. This decision was upheld by the State Supreme Court.

CITY NOW IN POSSESSION OF DAY-TO-DAY LINES

Formal possession of the 29 miles of day-to-day lines was taken by the city upon payment of the arbitrated price of approximately $2,300,000 decided upon by the board of arbitrators. With the lines the city acquired 128 cars similar to those in use on Woodward Avenue. The Detroit United Railway will continue to operate over the day-to-day lines and will pay the city 20 cents per car mile, the same amount the city pays the company for operating over its tracks on the Trumbull line. The current for operating the cars on the day-to-day lines now runs through the city's meters and no interruption of service will result while further plans are being made.

Ross Schram has been named as assistant general manager of the municipal railway.

Richmond Wages Cut

Pay for New Men Is Fixed Under the Readjusted Scale at Thirty Cents an Hour

Drastic cuts have been announced in the wages of all employees of the Virginia Railway & Power Company. The notice of the changes was posted on Dec. 31 at all carhouses in Richmond, Norfolk, Petersburg and Portsmouth. It is addressed to all employees of the several divisions of the railways of the company, including employees belonging to the several locals of the Amalgamated Association. The statement follows:

> Since the earnings of all our street railways have been steadily, and of late very rapidly, falling off because of unregulated jitney competition on routes served by street cars, the growing popularity of private automobile travel, and the general decline in industrial activity, while the operating expenses have remained practically stationary, it has become necessary to make a substantial readjustment of wages of all street railway employees.
>
> For the year ended July 1, 1921, the entire street railway system failed to earn operating expenses and fixed charges (interest on bonds, etc.) by $553,887, and since that time up to now the decline in travel has grown rapidly worse. This deficit in bond interest to July 1 last was made good by the company from other sources, not now available for this purpose.
>
> It is, therefore, necessary to cut down operating expenses to a point where the street railway system will at least earn the taxes and bond interest, hence it is proposed to put into effect the following wage scale for all motormen and conductors, effective Jan. 16:
>
> | First year | Second year | Thereafter |
> |---|---|---|
> | 30c per hour | 35c per hour | 40c per hour |
>
> Five cents per hour will be added to the above scale for one-man operation and for motormen and conductors employed on the Richmond-Petersburg interurban trains.
>
> The per hour rate of wages for all classified railway employees in shop and carhouse departments will be reduced 10 per cent from the present rates on Jan. 16, 1922.
>
> It is hoped that prompt relief, through jitney regulation, prohibiting such operation along the routes served by street cars, and more liberal franchises, relieving the street car rider from burdens now imposed, may so reduce operating expenses as to make unnecessary further reductions in wages.
>
> Full information is always available to all employees in order that they may fully understand the necessities of the case, and further information as to the present situation of the street railway finances will be gladly made available.

The present rate in Richmond, entered into a year ago last September, and continued after the expiration of the year without further definite agreement, provides for platform men, for the first three months in service, 43 cents an hour; for the next nine months 45 cents an hour and thereafter 47½ cents an hour. The cut therefore falls heaviest on short-term men.

There were no new developments at the offices of the company. General Manager Harvell said he knew only what he had read in the papers as to projected meetings of the employees and of committees to consider the new wage scale. He had not been asked, he said, for any conference, but would meet the men if they desired.

Approximately 700 men are affected by the wage cut in four cities—one-half of the entire number in Richmond.

Mr. Harvell said the company had not had occasion to employ many men since September, as there have been few vacancies, but has had many applications for appointments as motormen and conductors, and he was quite certain that any vacancies could be readily filled from a list of applications on file.

George L. Wilcox, executive secretary of the Central Trades and Labor Council, stated that the employees realize that the railway is not making money, but at the same time, he said, the men cannot live on much less than they are now receiving.

Twenty Hurt in New York Elevated Crash

One person was killed and twenty persons were injured in New York city on Dec. 30, when a four-car southbound elevated train crashed into a stalled four-car train on the Ninth Avenue line just south of the Forty-second Street station. The Interborough Rapid Transit Company is now conducting an examination of the causes of the accident. The following statement has been made by the company:

> The 6:34 p.m. Ninth Avenue train from 157th Street south bound in charge of Motorman Gallagher and Conductor J. Moran developed some electrical operating difficulties and stopped with the tail end of Gallagher's train at about Fortieth Street.
>
> A following Ninth Avenue train in charge of Motorman Aberaitis and Conductor Carrigan proceeded south from 157th Street and made all the station stops, including the station at Forty-second Street. Motorman Aberaitis started the train out of Forty-second Street and collided with rear end of Gallagher's train at about Fortieth Street, the accident happening about 7:05 p.m. A complete investigation is now being conducted.

"Warrant Basis" in Seattle

All warrants issued in payment of bill of the Municipal Street Railway, Seattle, Wash., with the exception of those given to trainmen and other employees, have been stamped "Not paid for want of funds until called." The street railway has been thus partly placed on a "warrant basis," so City Treasurer Ed. L. Terry may begin to accumulate sufficient funds to pay $833,000 of principal and $375,000 of interest due March 1 to the Stone & Webster bondholders of the $15,000,000 indebtedness. Officials estimate the sum should be on hand not later than Jan. 27.

A 1922 Resolution in Winnipeg

Winnipeg, Canada, believes in the good old resolution practice for the New Year. Ever mindful of giving better service to its patrons the Winnipeg Electric Railway has made an appeal to the public to co-operate in every way possible with the railway in 1922. The *Public Service News* has outlined ten resolutions which it suggests electric railway travelers should make. They are as follows:

1. That I will always have exact fare ready.
2. That I will ask for my transfer when I pay my fare.
3. That I will always move to the front end of the car.
4. That I will be near the exit door when my car reaches the point where I wish to alight.
5. That I will use the front exit when travelling on "front-exit" cars.
6. That I will not board the first car that comes along if it is well filled.
7. That I will give the street railway my full support and co-operation to the end that it may be able to serve me better.
8. That I will be on the look-out to suggest to the company where improvements for the common good might be made.
9. That I will always remember that delays in service are not of the company's seeking and that in most cases some "foreign" cause is responsible.
10. That I will join hands with the company in the endeavor to make the year 1922 a record one in point of service to the car riders.

Financing Being Probed

State Department Concerned Over Order Requiring Extension to Be Built at Tacoma

The attitude of the City Commissioners of Tacoma, Wash., toward a possible order of the State Department of Public Works requiring the Tacoma Railway & Power Company to construct an extension of the Sixth Avenue line into the College of Puget Sound and North Stevens Street district, with an attached condition that the city of Tacoma relieve the railway of some of its franchise requirements so that it can finance the extension, was probed at a recent hearing by the state department.

COMMISSIONERS BOUND BY CHARTER PROVISION

The reply of the City Commissioners was that they feel themselves morally bound by the charter provision that they cannot amend franchise conditions without authorization by vote of the people, even if the State law nullifies the charter in this particular, and gives them power to act on their own responsibility. The opinion of the Attorney General that the commissioners have the power to alter the franchise if they see fit to do so was read by the state officers without effect.

Evidence submitted by the department's own engineers and by the Tacoma Railway & Power Company's engineers showed that the proposed extension will probably not be able to pay its way for years, and that the company is unable at present to borrow funds or otherwise finance an extension of its lines although willing to do so.

Herbert J. Flagg, chief engineer of the State Department of Public Works, who investigated the proposed extension, stated that it would cost not less than $30,000, and the operating costs would be $14,414 a year, against which the estimated revenues, above what the company now takes in, would be $1,200 a year. Going into the company's finances, he said he found the company has gone $350,000 further in "red" during the past two years. The valuation of the company's properties he gave as $6,475,000, on which basis he said the company earned $0.88 per cent net income for the year ended Oct. 31, 1921, as against $0.41 per cent income for 1921, and deficits of years before the 10-cent fare. The indebtedness of the company he found to be approximately $6,800,000. Car riding had decreased 10 per cent since 1919.

RESIDENTS NOW WALK

The hearing was adjourned after the Councilmen had been asked to go on record, leaving the inference that the state department may issue such an order as indicated, and allow the Council to put the question up to the people of Tacoma at the May election, whether they want to forego paving between tracks and payment of some of the 2 per cent gross earnings tax, to help the College of Puget Sound and the North Stevens district people get railway service. The College of Puget Sound is held up on the matter of building on its new site until it is known where transportation is to be located. At present the residents of the district, totaling 1,700 persons, have to walk nine and ten blocks to a car line.

Wage Controversy to Be Arbitrated

Employees of the Springfield (Mass.) Street Railway and the Worcester (Mass.) Consolidated Street Railway voted on Dec. 30 decisively in favor of arbitration to settle their wage difficulties. The wording of the question on which the men voted was as follows:

> Would you, in order to avoid arbitration, be in favor of accepting a reduction from your present wage of 8 cents an hour from Jan. 1 to June 30, 1922, and 10 cents an hour from July 1, 1922, to Dec. 31, 1922, provided conditions and hours in old contract remain in force?

The proposition voted upon had not been made by the company. The result means that a board of arbitration will decide the issue. James J. Storrow is the head of the board.

Mayor Charges Pay Scale Discriminatory

Because of objection to the compensation allowed to trainmen of the Seattle (Wash.) Municipal Street Railway, Mayor Hugh M. Caldwell recently vetoed the entire salary schedule for city employees for 1922. It will now be necessary for the Council to pass the bill over the Mayor's veto, or prepare a new schedule.

The Mayor's chief objection to the trainmen's compensation is that the trainmen, now being paid on a daily basis, would receive a reduction of only 8 cents a day, while other day workers in the city's employ would be cut 25 cents a day. The proposed schedule for trainmen was a compromise proposed by the trainmen themselves, placing them on a monthly pay basis, and on the same salary level as policemen and firemen. The Mayor declares that this paves the way for policemen and firemen demanding time and half for overtime, a privilege now enjoyed by trainmen, and for the latter asking for one day off in eight, similar to the privilege granted policemen and firemen.

B. R. T. Plan Starts Second Year

The Employees' Representation Plan of the Brooklyn (N. Y.) Rapid Transit Company entered its second year with the election of representatives on Dec. 9 and 12. Seventy-three representatives were elected by the employees, and of these thirty-seven were office holders the previous year, which shows a practical backing of the work of the representatives. The plan calls for representatives from each group of employees, and where there are two or more for any group, the representatives hold meetings to elect a chairman. The election was closely contested in nearly all of the voting units, election day itself assuming all the marks of a national last-day campaign.

Kentucky Association Will Spread Utility News

The Kentucky Association of Public Utilities, Louisville, Ky., will issue on the first and fifteenth of each month a "New Service Bulletin" containing items of educational interest to public utility companies throughout the State. The aim as expressed in the Bulletin will be "to enlist your friendly interest and co-operation so that a better understanding of our mutual problems may be reached, to the end that the best service possible may be rendered the public."

The first issue, dated Dec. 15, contained among other articles "Service and Its Value," "Servants of the People," and the talk of Martin J. Insull, vice-president of the Middle West Utilties Company, Chicago, Ill., before the annual meeting of the Kentucky Association on Nov. 22 last. In a letter to the newspapers throughout the State the association invites all local utility news for possible publication in the New Service Bulletin.

"Support the Old, Attract the New"—1922 Slogan

A New Year's Greeting with all good wishes was extended in the form of a letter by W. H. Boyce, general manager of the Beaver Valley Traction Company, New Brighton, Pa., to all his employees. In his "Happy New Year" message Mr. Boyce says:

> It is essential that you
>
> 1. Be polite, and thus avoid many possibilities of trouble with car riders.
>
> 2. Be patient with the aged, the infirm, the casual non-understanding rider, and when waiting at transfer points and railway stations; thus gaining the esteem and proper recognition of your ability by patrons and supervisors.
>
> 3. Be sincere in conversations concerning the affairs of this company either with patrons, supervisors, or fellow empoyees.
>
> 4. Be honest in word and deed with yourselves, the public and your company.
>
> 5. Be enthusiastic and earnest in your efforts to give the very best brand of street railway service to be found anywhere.
>
> 6. Be confident that the higher officers of this company always want us to have a square deal, and they expect us always to give one.
>
> 7. Be loyal to your company, your supervisors, and your fellow workmen. Elbert Hubbard has said, "If you work for a man, in heaven's name work for him." We add to that, "If you are working with men, for heaven's sake work with them."
>
> 8. Be harmonious. The utmost harmony among employees of the different departments must prevail at all times, for courteous, respectful treatment of each other will result in better service to the traveling public.
>
> 9. Be happy. By radiating and distributing happiness, you so affect all the persons with whom you come in contact that they must reflect your spirit. This will have a tendency to make all of the foregoing easier of accomplishment.

In conclusion the greeting says:

> It is with extreme gratification that I realize that this letter is going to be read by employees, all but 2½ per cent (trainmen all) of whom have been in our service over one year, and each of whom I can depend upon for full support in making this year 1922 a happy, prosperous one by furnishing SERVICE—EVERY WAY—ALWAYS.

Interurban Gasoline Rail Line

The proposition of building a railroad between Vallejo and Benicia, Cal., was presented to the Benicia Chamber of Commerce at a meeting on Oct. 27 by Arthur Hargraves, representative of the California Car Company, located at Richmond. The possibilities of a railroad between the two cities had already been presented to local interests, who have approved of the plan.

Mr. Hargraves represents a company which builds a light-weight gas-motor driven car. The car, it is claimed, can be operated at one-fifth the cost of a steam train and at one-third the cost of motor buses. The proposed line would have two of these cars, each with a capacity of forty persons and a maximum speed of thirty-five miles. Track for the cars can be built at a cost much less than that entailed for track for steam and electric trains. The cars themselves would cost approximately $11,000.

Chicago Committee Not Committed to Any Policy

The local transportation committee of the City Council of Chicago, Ill., has made no progress in its attempt to get from Mayor Thompson an expression of views on a new traction settlement. At a meeting held on Dec. 28 the Mayor refused to appear, but sent instead a letter in which he charged Chairman Schwartz with having argued against the Thompson plan for people's ownership and a 5-cent fare. He wanted to know if Alderman Schwartz agreed with him in the principles that:

> The streets belong to the people. The people ought to own and operate their means of transportation. The agency to be set up to manage or operate the system of local transportation in behalf of the people should be a board of trustees to be elected by the people.
>
> The fixing of a 5-cent fare to remain at that figure until changed by authority of the people.

It was decided to tell the Mayor that the committee was not committed to any plan and that he would be welcome to submit his proposal.

Several of the Aldermen wanted to take steps to prevent the city administration from diverting the 55 per cent of net receipts to the corporate fund in the event that it is turned over through court proceedings. This is the share of the companies' revenues which the city has refused to accept. It was decided to appoint a sub-committee to look into the matter.

Port Plan Advanced

With the exception of a few minor changes made at the suggestion of New York and New Jersey engineers, the port of New York authority on Dec. 16 adopted unanimously the plan for port development based on the linking of the two states with a system of belt lines which will be submitted to the Governors of the two states. The plan is ready for the Legislatures.

Recommendations that the project be self-supporting, and that no added taxes be levied on the people of the two States for its inception and maintenance were noted by the port commissioners. The changes made in the plan were for the facilitation of transporting foodstuffs for New York by altering some of the belt lines and changing the grade of one of the railroads.

The commissioners have arranged a conference with the presidents of the fourteen railroads contributing to the port development plan.

Equipment Arrives in Miami

Officials of the city of Miami, Fla., which has just taken over the lines of the defunct Miami Traction Company and ordered new equipment to replace that which was burned when the company lost its power plant and car house more than a year ago, have received word that the new cars which were ordered have been shipped. R. L. Ellis, manager of the Miami Beach Electric Company which will operate the Miami electric lines, paying a rental of $6,000 a year on the city's investment of $100,000, states that he expects to be operating by Feb. 1.

Plans for regulating the jitney and bus lines after the trolleys resume are under way, and probably will include elimination of the bus lines along routes traversed by the trolley.

Way Reopened for Negotiations

Court Holds Nothing So Far Done in New Orleans Negotiations Warrants Judicial Interference

The negotiations between the security holders of the New Orleans Railway & Light Company, New Orleans, La., and the members of the Commission Council which were so abruptly terminated recently by the State Supreme Court, just as the finishing touches were being put to the modified Maloney plan of railway settlement, may now be resumed, if only temporarily, under a decision just rendered by Judge Porter Parker, of the Civil District Court.

It will be recalled that Judge King, of another division of the Civil District Court, on June 30, 1921, issued an order requiring the city of New Orleans, the Commission Council and Mayor McShane, to show cause why they should not be enjoined from entering into an agreement with the company for a rate of fare in excess of 5 cents. This order by the court was made at the instance of the Attorney General.

A suspensive appeal, subsequently sought by the city, was denied by the court, and upheld by the State Supreme Court, to which tribunal the city next appealed for redress, the High Court holding that Judge King was right in refusing to grant the appeal, and that application should be made to the lower court for a dissolution of the injunction which the City sought.

It was at this stage of the long-drawn-out litigation that the negotiations betwen the city and the security holders of the company were broken off and the conferences halted until the opinion of the lower court could be had.

JUDGE PARKER'S RULING

The contention of City Attorney Ivy G. Kittredge, in his petition before Judge Porter Parker, to which court the case was next assigned, was that the Civil District Court was:

1. Without jurisdiction.
2. That the suit was premature since the action was predicated upon what it was thought the Commission Council intended to do.
3. That the petition of the State discloses no cause of action, no ordinance having as yet been adopted by the Commission Council affecting the rate of fare.

The argument of the State was that the Commission Council was without authority to abrogate what was termed "traction contracts," and that the Commission Council had no rate-making power, that power being vested exclusively in the State Public Commission.

Judge Parker, in his decision, took cognizance of only one of the exceptions of the city, namely, that the action instituted by the State was premature, the court holding that the city was well within its rights to negotiate with the New Orleans Railway & Light Company, and could not be prevented from adopting an ordinance affecting electric railway rates, unless the ordinance so adopted was illegal and *ultra vires*, when an appeal to the courts to restrain the city from enforcing the provisions of the ordinance would then lie.

At the time that the decision of the Supreme Court was rendered, denying the right of suspensive appeal to the injunction issued by the Civil District Court, Attorney General Coco was credited with the statement that he would abide by the opinion of the lower court and would not seek to further prolong the litigation. It is true that it was anticipated that the court would pass upon the validity of the authority which the city assumed as a rate-making power in the negotiations that were interrupted by the Supreme Court. This question is still left unaffected by the decision of the lower court. Judge Parker said in conclusion:

> Under this condition of affairs, the matter comes before me.
>
> Exceptions were filed, first, to the jurisdiction of the court; second, that the suit was premature, and, third, that the petition disclosed no course of action.
>
> The exception of prematurity, in my opinion, is well founded. There is nothing official as to what ordinance the Commission Council contemplates adopting, and an injunction will not lie, anticipating the legislative action of the Commission Council.
>
> Should the Commission Council adopt an ordinance which is illegal and *ultra vires*, it will then be time to appeal to the courts to enjoin the enforcement of such ordinance should it be illegal.
>
> The plea of prematurity is, therefore, sustained, and the rule *nisi* is recalled and plaintiff's suit is dismissed at its cost.

Judge Porter Parker on Dec. 30 granted Assistant State Attorney General Paul Sampoyrac an appeal to the State Supreme Court in the action brought by the State against the Commission Council, questioning its authority as a rate-making power and alleging it was about to enter into an agreement with the New Orleans Railway & Light Company for an increase in railway fares. As the lower court on Dec. 26 dismissed the application of the State for an injunction on the ground of "no cause for action," the question of prematurity will therefore figure in the appeal.

Some belief is expressed that the matter may be solved from quite an unexpected source during the coming week, for it is thought in well-informed legal circles quite unlikely that the State Supreme Court will seek to enjoin the city from doing what the State only presumes it intends to do. Those who are of this opinion hold that the Commission Council being a legislative body, as it were, it would be setting a very dangerous precedent for the court to interfere in a presupposed action which it is alleged or presumed the Commission Council intended to take. The lower court practically held that it could not do so until the Commission Council had acted.

Lower Wages in Effect in Dallas

The Texas Electric Railway put a reduced wage scale for all its employees into effect on Dec. 1. The wage reduction cuts $8,000 from the monthly pay roll.

The wage cut affects all the trainmen on the interurban lines, employees in all the offices of the company and employees of the electric railway lines in the cities of Waco, Denison, Sherman, Corsicana, Waxahachie and McKinney. While the cut varies for individuals, it will average about 7½ per cent. Shrinkage of more than $500,000 in passenger business since Jan. 1, 1921, is assigned as the cause for the reduction. This cut was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 26.

Information Lessens Hostility

In a report of its first year's work the Ohio Committee on Public Utility Information points out that through the work of the committee the public attitude of hostility toward utilities has changed to one of open-mindedness, the unjustifiable criticism and newspaper attacks have lessened and the newspapers are increasingly urging fair play for the utilities.

The committee, one of the first of its kind formed to disseminate information about utilities in a concerted manner, has succeeded, through weekly news bulletins, in having published in the 300 Ohio newspapers which it checked 921 solid newspaper columns of material. Of this, 107 columns were devoted to the electric traction industry. Through its speakers' bureau 6,000 people were told directly of the problems confronting the utilities, and the publicity given these speeches carried them to a far greater number of readers.

Looking to the future, the committee plans to expand the speakers' bureau, so that in each county of Ohio there may be at least half a dozen talks each year on utility subjects and that every large utility in the state may have at least two capable talkers on utility topics. Besides improving the news bulletin, it expects also to issue pamphlets for use in schools, colleges and universities describing the operation of each phase of the utility service, telling the history and the development of utilities, how they are and must be financed, their regulation, their relationship to the communities they serve and the problems that beset the operators.

"At the Point of the Bayonet" the Winner

The "short story contest" for former service men in the employ of the Kansas City (Mo.) Railways, arranged as a feature of the American Legion convention issue of the *Railwayan*, proved successful far beyond expectations. The contest confined the offerings to stories by ex-service men of personal experiences or of the experiences of others. Forty stories were submitted to be judged by the employees. Blanks had been sent to all divisions, on which the votes were to be recorded, ranking the six best stories of the forty printed in the convention issue of the *Railwayan*. Two or three hundred votes had been expected; there were 1,671 employees, however, who filed their votes, and every story printed received some votes. The six receiving the highest number of votes were the winners. Roy A. Potter, an employee at the shops, wrote the first-prize story, a record of his experience during a raid on German trenches, the title of which was "At the Point of the Bayonet."

An interesting feature of the war experience contest was that the interest of the hundreds of employees was entirely unselfish in their voting and reflected the strong morale and good feeling among the personnel of the railway organization.

A second contest similar in nature to the first is now under way. It has several angles of value. A definite subject has been designated: "Why the Kansas City Railways is one of the best organizations in the United States." The contest is open to all employees.

Playing Politics With Trainmen's Wages

Under a new ordinance proposed by the finance committee of the City Council of the Seattle, Wash., the trainmen operating the lines of the Seattle Municipal Railway will be placed on a monthly salary basis, instead of the present day wage.

Mayor Hugh M. Caldwell is opposed to the proposed monthly salary plan, declaring that it will lead to complications with the police and fire departments. He points out that being on a monthly basis, the trainmen would be in the same class with firemen and patrolmen and would naturally expect one day off in eight, as is the case with the two latter classes. This would mean a tremendous increase to the railway operating expenses.

On the other hand, the trainmen are paid time and one-half for overtime, and he considers it likely that the policemen and firemen will soon ask for this same form of payment. Mayor Caldwell charges the Council with directly evading the question of wage decreases for trainmen, "because of their influence and numbers." The proposed new salary ordinance for city employees reduces the wages of all other workers except the trainmen, and the proposed monthly plan means a virtual increase in their present salaries.

The finance committee has approved the ordinance and it will come up for an early vote by the City Council.

Wheeling Inclined to Go Slow on Bus Proposal

A representative of Council in every city where the Wheeling Traction Company operates will be asked by the City Council of Wheeling to meet and discuss a proposed reduction in fares suggested by C. P. Billings, vice-president and general manager of the Wheeling Traction company.

The decision to this effect grew indirectly out of the meeting of the City Council of Wheeling held to discuss the granting of a permit to the Ultimate Bus Company to operate buses over the streets of Wheeling. Members of the Council were unable to agree on any definite action. Attorneys George C. Beneke and James M. Ritz, representing the Ultimate Bus Company, addressed the meeting and the Wheeling Traction Company presented data as to its financial condition. Council then decided to appoint Dr. E. S. Bippus to represent Wheeling's Council at a meeting of all Council bodies in the vicinity of Wheeling where the Wheeling Traction company operates.

Mr. Billings told Councilmen Bippus, Otto and Tahey, who compose a committee appointed by City Council to investigate the application of the Ultimate Bus Company, that if the buses continue to operate, the traction company will have to discontinue, but that if a permit is refused the bus company, the Wheeling Traction Company will continue to give the best service possible, and that the prospects were that fares could be reduced. For instance, the fare to Bellaire would be made 25 cents for a round trip instead of 16⅔ cents one way if his idea was carried out. He also said he would like to see the fare on the other divisions reduced.

Following the talks of Attorneys Beneke and Ritz, members of Council discussed the conditions of the railway and the bus companies from all angles. It was suggested that a signed statement be made or that Mr. Billings be asked to make a statement in open Council that he will ask the Public Service Commission to grant permission to reduce fares and that his company would give better services and as soon as possible repair the streets of the city.

Elevated Car Falls Into Street

Two trains of the Boston (Mass.) Elevated Railway running empty collided in Forest Hills on Dec. 5. The force of the collision wrenched the body of one of the cars free from the forward truck, which fell into the street below while the car body remained suspended from the structure in the threatening position shown in the accompanying engraving.

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HOISTING BOSTON "L" CAR OUT OF STREET

If Money Comes Can Improvements Be Far Behind?

"There is a lot of difference between what you would do if you had the money to do it with, and what you are merely thinking about doing some day if the company can afford it." Thus spoke J. P. Barnes, president of the Louisville Railway, in discussing an article appearing in a local paper, which stated that the company was planning numerous improvements. Mr. Barnes said:

> I merely discussed some of the things we would like to do. We would like to get away from hauling such heavy cars on our interurban runs, and replace them with cars of about half the weight. We'd use more one-man cars, and lighter cars, and might even use one-man cars on some interurban runs. By reducing weight we'd be able to reduce load on power station, and save considerable in operating expenses. Of course for years we've planned eventually to close down the Campbell Street power plant some day and enlarge the Riverside power plant to carry the entire load. We've even considered bus lines, bus trolleys, etc., but never seriously, as we've not been in position to do so.

Mr. Barnes admitted that most of the considering that was being done was of ways and means to reduce operating expenses, and still perform service, so that the company could make a little money, and give the common stock holders something in return for their investment, which has been a poor paying proposition for some years past.

Separation of Railroads from Power Companies Urged

Separation of the railroad companies from the power plants was advocated by S. C. Lindsay, engineer of the Puget Sound Power & Light Company, in an address recently. He maintained that the same power systems, which furnished the railroads could furnish power to the manufacturing plant and the farmer along the railroad route.

"For this reason it is much better that railroad companies confine themselves to the railroad business and obtain their power for railroad operation from companies who have specialized in the production, transmission and distribution of this commodity," said Mr. Lindsay.

The second great epoch in railroad history began in August, 1919, with the electrification of the Chicago, Milwaukee & St. Paul line between Othello, Wash., and Seattle and Tacoma, according to the speaker. The first began when the Union Pacific and Central Pacific lines were connected at Salt Lake City on May 10, 1869.

The Washington Water Power Company of Spokane supplies power for the Othello-Seattle-Tacoma line of the Chicago, Milwaukee & St. Paul from its plant at Long Lake. The Puget Sound Power & Light Company of Seattle also supplies the line from its power plant at Snoqualmie Falls. These companies are able to supply all additional water power needed for electrification of the other transcontinental railroads coming into Seattle. The two companies will use about 28,000 hp. of water driven generators to supply the Chicago, Milwaukee and St. Paul line.

Uniform Mileage Basis Ordered

The California State Railroad Commission on Dec. 24, 1921, handed down its decision on the fare application of the Pacific Electric Railway, Los Angeles. The company has announced that it will abide by the order, which is effective twenty days after Dec. 24, and on Dec. 31 President Paul Shoup stated that the new rates would go into effect on Jan. 1.

The decision establishes a uniform mileage scale which amounts to a substantial reduction in interurban fares and wipes out all inequalities in their computation. It also establishes two 6-cent fare zones in the city of Los Angeles with a 10-cent through fare, eliminates blanket beach rates except on week ends and holidays, and declares that local service in towns outside of Los Angeles must be made to pay or be discontinued. The commission also indicates the preliminary steps to be taken toward the establishment of a universal transfer system, whereby the Los Angeles Railway and the Pacific Electric will exchange transfer privileges.

The decision is the result of the application of the company on June 11, 1921, for a complete survey of its rates and service and the establishment of a rate schedule on a permanent basis.

The commission order includes certain clauses relating to improvements in track and service and the construction of a tunnel on the Hollywood line. These clauses the company has also accepted in an announcement that it will spend $2,600,000 in constructing a tunnel and will add fifty new cars for the service.

The details of the commission's decision will be given in the ELECTRIC RAILWAY JOURNAL for Jan. 14.

Economics Lecture Course for Chicago "L" Employees

The first of a series of lectures on the financial and economic side of the electric railway business for the supervisory forces of the Chicago Elevated Railways has been arranged by President Britton I. Budd. The lectures are to be given by Prof. Ralph E. Heilman, dean of the School of Commerce, Northwestern University, whose subject was "Franchises" at the first lecture, given on Oct. 20.

There were 300 employees in attendance. The idea of the course is to broaden and develop the employees for more useful service to the company and for their contact with the public.

In stating the objects of the course to those assembled at the opening of the first meeting, Mr. Budd said:

> In these days of regulation of utilities under the laws of the state, all of our affairs are public and it is therefore essential that every man in a supervisory capacity should have a thorough understanding of the financial side of the company's affairs, not only as a matter of giving more efficient service to the company and being able to talk intelligently with the men under him, the public, and with his neighbors about the company's affairs, but also to prepare him for greater responsibilities.
>
> There was a time in the railroad business when a man only had to master the details of his particular job, but the 1921 model is of a different character. He not only has to have knowledge of the practical side of the job in his charge, but he has to know about costs of the work he is doing and the relation to the total cost of operation of the department he is in. It is necessary for him to have the ability to analyze figures and statements to further his promotion. We are surrounded by laws and regulations covering rates, service and accounting, all of which relate back to the financial side.
>
> In our organization I wish to develop material for leadership. I want the young men to feel that there is opportunity and I want them to feel that they are making progress, either in experience or position, and that time spent in the organization is time well spent. I want the older men to fight against being too satisfied with themselves, because of the danger of getting into a rut.

Wants Rate-Making Power in Commission's Hands

The House of Representatives of the Louisiana General Assembly has passed a bill vesting in the Commission Council of New Orleans rate-making power in dealing with public utilities.

The purpose of the bill is to clothe the Commission Council with authority to fix the rates of the New Orleans Railway & Light Company.

The House of Representatives also passed a bill to impose inspection fees on common carriers. This measure is intended to provide a fund for the use of the Public Service Commission to be expended under the direction of a board composed of the Governor, the Auditor and the Treasurer. The license fee will yield, it is thought, about $30,000 annually, a sum deemed sufficient to employ rate experts to investigate rates of public service corporations.

Recommends Rehabilitation

Restoration of the electric railway system at Lafayette, Ind., to its former condition as an operating property was recommended by the receiver of the Lafayette Service Company through abandonment of the Owen Street and fair ground lines, the purchase of twenty one-man cars and complete rehabilitation of the entire railway system.

The financial report of R.W. Levering, receiver, showed a mortgage indebtedness of $225,000, a claim of security holders for $7,952 and a balance of about one-half of the debt covering the railway company's share of constructing the Main Street bridge and approaches. It showed also a deficit of $11,060 for the year's operation of the 18.66 miles of track which comprises the city system. An estimate for the operating expenses for the coming year with the service, new equipment and changes proposed placed the net income of $34,965.

Included in the proposed plans for the lines is the elimination of bus competition across the Main Street levee, the sale of the present power plant and the purchase of energy. The cost of purchased power would not exceed 2.52 cents per kilowatt-hour, which is less than the expense of generating energy for the company at its own plant.

The present cash fare of 7 cents, or four tokens for 25 cents, is used as the basis of computing revenue in the receiver's report. The cost of rehabilitation, which is placed at $110,000, exclusive of the cost of construction of a new substation and the cash payment of new one-man cars, which would bring the total to $165,000, does not include paving work. This the company is under contract to keep in order. The company also will have to pay for paving of South Ninth Street and Owen Street when the tracks are removed under the present plan.

Purchase Offer Refused

With bondholders and bondsmen failing to consent to the sale of the Ashtabula Rapid Transit Company property to the city of Ashtabula, Ohio, for $150,000 and with the city officials and citizens favorable to no higher price, negotiations between the two parties apparently are at a standstill.

At a recent meeting of bondholders and bondsmen in Cleveland relative to a discussion of the sale price of $150,000 there was no definite decision made to sell the property at this figure, nor was there a decision made against that figure. In November citizens defeated a proposal to buy the property for $197,000.

Certain of the stockholders favor reorganization of the company.

Erie Canal Channel Approved for Transit Line

Unanimous approval of the proposed use of the Erie Canal channel for an industrial and rapid transit railroad was expressed at a hearing in Rochester, N. Y., of the public works and finance committees of the Common Council. Plans for the new street which is to be opened to South Avenue over the subway were discussed, which included suggestions that the street be kept free from street railway tracks. The space could be advantageously used for automobile parking, it was stated, to relieve congestion elsewhere. The street is to be not less than 52 ft. wide between curbs, according to present plans, and in addition the sidewalks are to be 14 to 20 ft. in width. Overhead trolley system will be used for the electric locomotives instead of the third rail, and there will be three main stations, one at South Street, one at City Hall and one north of Main Street, near Oak Street.

The total cost of $1,800,000 will be divided between the New York State Railways, which will pay approximately $45,000; the benefited property owners, who will pay $325,000, and the city at large, which will pay the remainder of $1,430,000.

Ibanez Favored in Louisville

The Louisville (Ky.) Railway recently chartered an electric car to the Majestic Amusement Company for use in advertising "The Four Horsemen," a film play showing at the Majestic Theater. This is probably the first time in the history of the city that an electric car has been chartered and used steadily for several days in advertising anything.

The company does not permit any banners or advertising matter to be attached to the outside of any of its cars. In this case thin paper signs, with huge red letters, advertising the show, were placed inside of the car, showing well in daylight, and equally well at night with the light shining through the paper.

Under rates of the company cars are chartered at the rate of $11 each for the first two hours, and $4 for each hour in twenty-four thereafter. This car was chartered for five hours per day for three days, or $34 a day, the total charge being $102. The company wouldn't mind if quite a bunch of advertisers would run cars over its lines in the downtown district even, at that sort of rate.

Financial and Corporate

Bond Issue Approved

Vote at Columbus, Ohio, Regarded As Expression of Confidence in Local Management

The stockholders of the Columbus Railway, Power & Light Company, Columbus, Ohio, on Dec. 31 voted to approve the proposed issue of $5,000,000 of twenty-year 6 per cent bonds for the purpose of retiring old bonds. The vote was more than five to one.

The vote on the proposition was one of the largest ever cast by stockholders of this utility on any proposal submitted to them. A total of 78,501 shares was represented in the balloting out of the 118,643. The acceptance of the financing plan by the stockholders is looked upon as a gratifying expression of confidence in the administration of the company's affairs by President Charles L. Kurtz and a home management.

In a statement issued following the balloting President Kurtz declared that the action of the majority stockholders brings near the culmination of the company's "endeavor to render a service that will meet the full needs of the public." He directed attention to the fact that the plans thus approved call for the immediate retirement of the $3,000,000 of three-year 8 per cent bonds outstanding, with a saving of $41,000; the retirement of the last $232,000 of the old Central Market bonds, and the paying off of notes held by Columbus banks amounting to $235,000. It also makes possible the cancellation of $396,000 of notes held by the General Electric Company and current bills in the amount of $590,000.

LONG DEBATE AT MEETING

The contract for the sale of the bonds has been awarded to Harris, Forbes & Company, New York, who have sold the securities at 93 per cent of par, the transaction having been approved by the board of directors of the Columbus company and by the Ohio Public Utilities Commission.

At the meeting of the stockholders on Dec. 31 opposition was voiced by the Clark interests through their attorney, J. M. McCarty, and W. H. Sawyer, vice-president, and by a single director of the Columbus company, William A. Gill. The opposition maintained that the floating of the bond issue is untimely and that money will be cheaper later; that there was no real need of a new financial arrangement just at this time.

In reply to the opposition, former Attorney General Edward C. Turner, legal adviser for the Columbus Railway, Power & Light Company, praised the present management of the line, and read correspondence which he said tended to show that the Clarks had threatened company officials with opposition to the plan of finance unless a "satisfactory arrangement" could be arrived at over the Slaymaker accounting suit against the Clark company, now pending in the Common Pleas Court of Franklin County, Ohio, and in which a master commissioner's finding of some $300,000 against the Clark company and in favor of the Rail-Light Company is to be passed upon soon. Attorney Turner also read a telegram from the Clark company in which the latter declared that no money has been received to pay for coupons due on Jan. 1. To meet these coupons payments the Columbus company was compelled to draw from the banks almost all its available cash and forward it to Philadelphia.

Attorney McCarty told the stockholders that the affairs of the company had been administered economically under the Clark régime, to which Mr. Turner replied that when the home management of the company took over the control from the Clark interests there was no surplus, while under the management of President Kurtz and his associates in Columbus a surplus of approximately $1,900,000 was built up. The debate between the opposing interests occupied a period of more than three and a half hours, preceding the balloting by stockholders at the regular meeting.

Intense interest was manifested in the election by Columbus residents and by stockholders of the company in view of a circular letter sent out by the Clark interests under date of Dec. 22, to all the stockholders, voicing opposition to the proposed bond issue. In a counter move President Kurtz addressed a statement to the stockholders through the advertising columns of the daily newspapers, directing attention to the Clark circular and the forthcoming meeting. Mr. Kurtz declared that:

> Although indirectly denied in the circular letter, the purpose is thinly disguised that E. W. Clark & Company, lately managers of your property, again desire to assume the management and to conduct the affairs of the company in the old way and by doubtful methods which have been made the subject of litigation, and which have been frowned upon by the court. There is nothing in the circular letter sent out by E. W. Clark & Company, Philadelpha, requiring any answer by the management.

Reasons for Consolidation Set Forth in Brief

The contentions of the Indiana Electric Corporation in favor of its application to issue approximately $18,500,000 in securities for the purchase of seven public utility plants in Indiana, including the property of the Indiana Railways & Light Company, at Kokomo, are set out in a brief filed with the Public Service Commission by attorneys for the corporation.

The brief contends that the physical property of the seven concerns is worth $18,726,773 and that material and supplies and working cash capital amount to $650,000, making a total valuation of $19,376,773.

The earnings for the year ending Oct. 31, 1921, were $1,472,722, according to the brief, while the fixed charges of the new corporation would amount to $943,550 annually, leaving $529,172 for depreciation and common stock dividends.

The brief states at length the benefits which are expected to be derived from the consolidation.

Reorganization Planned

Electric Bond & Share to Have Hand in American Cities Company's Affairs

The committee representing the holders of the 5 and 6 per cent collateral trust bonds of the American Cities Company has announced that it has approved and adopted a plan and agreement for the reorganization or readjustment of the American Cities Company. A copy of the plan is being sent to each of the holders of certificates of deposit of the bonds under the deposit agreement dated Jan. 15, 1919.

Under the plan, a new company known as the National Power & Light Company has been organized in New Jersey. The shares of the company's capital stock are without par value and are divided into preferred and common stock. The preferred stock is entitled, in preference to the common stock, and limited, to dividends of $7 a share per annum, cumulative from Jan. 1, 1923. It is redeemable after three years upon the vote of not less than a majority in interest of the outstanding common stock.

The National Power & Light Company will issue fifty-year 7 per cent income bonds, which are to be subject to the prior payment of the principal and interest of all indebtedness and contractual obligations of the company now or hereafter outstanding. Interest accrues on these bonds from Jan. 1, 1922.

The companies controlled by the American Cities Company were: Birmingham Railway, Light & Power Company, Houston Lighting & Power Company, Knoxville Railway & Light Company, Little Rock Railway & Electric Company, Memphis Street Railway and New Orleans Railway & Light Company. The Birmingham, Memphis and New Orleans companies are in the hands of receivers. The New Orleans company will be excluded from any future plans of the committee.

The plan contemplates that the Memphis Gas & Electric Company will become part of the undertaking. The development, financing and engineering of the new company and its subsidiaries will be in the hands of the Electric Bond & Share Company.

Under the terms of the plan holders of certificates of deposit of American Cities Company 5 and 6 per cent collateral trust bonds will receive 55 per cent of the principal amount of the bonds represented by each certificate of deposit in fifty-year 7 per cent income bonds, 25 per cent in cumulative preferred stock and 35 per cent in common stock of the new company, the shares of stock being treated as having a par value of $100 for the purpose of applying these percentages.

The National Power & Light Company will offer to the holders of preferred stock of American Cities Company the right with respect to every full twenty shares of stock to purchase a block of securities of National Power & Light Company, consisting of a fifty-year 7 per cent income bond for $100 principal amount and seven shares of common stock for $242.50 plus accrued interest from Jan. 1, 1922, on the income bond. Electric Bond & Share Company and Isidore Newman & Son have agreed to purchase sufficient of said blocks so that the new company will receive a total of $2,000,000.

$160,015,860 in Maturities

Thirty-seven Per Cent of the Total of $432,934,890 of Utility Maturities in 1922 Falls to Electric Railways

Public utility securities falling due for payment during 1922 aggregate $432,934,890 against $305,110,350 in 1921 and $196,296,800 in 1920. Of the total for all the utilities the amount maturing in the electric railway field in 1922 is $160,015,860. In 1921 railway maturity amounted to $207,617,530.

The heaviest maturities in the railway field are in New York City. Among these issues are the Interborough Rapid Transit Company's $39,199,000 one-year extended 8 per cent notes due September, 1922 and the Brooklyn Rapid Transit Company's $18,000,000 6 per cent receiver's certificates.

Below is given in detail as compiled by Dow, Jones & Company the various electric railway issues of more than $200,000 maturing in 1922.

Corporation	Rate	Amount
January		
Columbus Ry., Pow. & Lt. notes	8	$2,500,000
Little Rock Ry. & El. 1-yr	8	700,000
United Gas & Electric 1st	5	396,000
Springfield & Eastern Ry. 1st	5	330,000
Central Market St. Ry. 1st	5	325,000
Eastern Mass. Street Ry. ref.	6	300,000
New Bedford & Onset Ry. 1st	5	280,000
Virginia Ry. & Power notes	6	250,000
Minneapolis St. Ry. joint cons.	7	5,000,000
January total		$10,081,000
February		
Bklyn. Rapid Tr. rec. ctfs.	6	$18,000,000
American Rys. 3-year notes	7	3,000,000
West End Street Ry. deb.	5	2,700,000
Wisc.-Minn. Lt. & P. 1-yr. nts.	8	1,000,000
Detroit & Pontiac Ry. 1st	5	500,000
Washington Water P. notes	7	3,000,000
February total		$28,200,000
March		
Public Serv. of N. J. cv. notes	7	$12,442,600
Federal Light & Trac. deb.	6	1,500,000
Galveston-Houston Elec. notes	7	1,500,000
Canton-Akron Railway 1st	5	1,145,000
Albany South R.R. 1-yr. nts.	7	550,000
Middle West Utilities F. nts.	6	300,000
Oakland, San L. & Hay El. Ry.	6	250,000
Richland Pub. Service notes	7	850,000
Charleston Interurb. R.R. nts.	6	450,000
March total		$18,987,600
April		
Denver Tramway coll. tr. nts.	7	$2,500,000
Jackson Lt. & Trac. 1st	5	930,000
Dayton, Cov. & Piqua Tr. 1st	5	490,000
Ironwood & B. Ry. & Lt. notes	7	294,000
Dallas Electric Corp. coll. tr.	5	282,000
April total		$4,496,000
May		
Monongahela Val. Tr. 1-yr. notes	8	$2,000,000
Montreal St. Ry. sterl. deb.	4½	1,926,260
Penna. & Mahoning Val. Ry. 1st	5	1,559,000
Freeport Ry., Lt. & Power 1st	5	260,000
Commonwlth. P., Ry. & L. notes	7	250,000
Penna.-New Jersey R.R. 1-yr. notes	6	250,000
May total		$6,245,260
June		
City and Suburban Railway 1st	5	$3,000,000
Ind., New Castle & East 1st	6	1,200,000
Nova Scotia Tram. & P. notes	7	1,000,000
Berkshire Street Ry. 1st	5	800,000
Chattanooga Ry. & Lt. 1-yr. notes	8	750,000
W. Penn. Tr. & Wat. Power notes	7	400,000
June total		$7,150,000
July		
Union Trac. of Indiana 1st	5	$4,623,000
Cinc., Newport & Cov. Ry. 1st	5	2,850,000
Columbus Elec. 3-yr. notes	6	1,750,000
Cass Ave. & Fair Grounds Ry. 1st	4½	1,640,000
Steinway Railway 1st	6	1,500,000
Clev., Painsv. & Ashtabula R.R.	5	1,000,000
Pitts. & West End Pass. Ry. 1st	5	343,000
Vicksburg Light & Traction deb.	6	278,000
Hamilton & Linden El. Tract.	5	250,000
Concord, May & Hud. Ry. 1st	5	230,000
Ottawa Electric Railway 1st	4	400,000
July total		$14,864,000
August		
Montreal St. Ry. sterl. deb.	4½	$584,000
Detroit United Ry. 1st coll.	8	500,000
United Rys. & El. of Balt. notes	6	3,000,000
Unit. Rys. & El., Balt., cv. notes	5	1,528,000
August total		$5,612,000
September		
Interborough R. T. ext. notes	8	$39,199,000
Manila Elec. Ry. & Light notes	7	1,500,000
Tri-City Railway 1st	5	1,375,000
Worc. & Southbr. St. Ry. 1st	4½	500,000
September total		$42,574,000
October		
Rockford & Interurban Ry. 1st	5	$1,705,000
Pueblo & Suburb. Tr. & Lt. 1st	5	1,697,000
Bangor Ry. & Elec. cv. notes	6	250,000
October total		$3,652,000
November		
Brazilian Trac., Lt. & P. notes	6	$7,500,000
Manchester Tr., Lt. & P. notes	6	1,750,000
Montreal Street Ry. deb.	4½	764,000
Central Crosstown R. R. 1st	6	250,000
November total		$10,264,000
December		
Tol. Trac., Lt. & Power deb.		$3,000,000
Toledo Trac., Lt. & Power 1st	7	2,500,000
Portland Ry., Lt. & Power notes	7	1,000,000
Sandw., Winds. & Am. Ry. cons.	4½	600,000
Hagerst. & Fred. Ry. 1-yr. notes	7½	540,000
Wilkes-B. & Wyo. Valley Tr. clt.	5	250,000
December total		$7,890,000

Public utility bonds and notes maturing in:

January	$10,081,000
February	28,200,000
March	18,987,600
April	4,496,000
May	6,245,260
June	7,150,000
July	14,864,000
August	5,612,000
September	42,574,000
October	3,652,000
November	10,264,000
December	7,890,000
Total electric railway maturities	$160,015,860
Total public utilities maturing in 1922	$432,934,890

Agreement on Receivership Terminates Litigation

A friendly agreement has been reached with respect to the receivership of the Ephrata-Lebanon Traction Company, Lebanon, Pa., and the Ephrata-Lebanon Street Railway so that the work of re-establishing the railways will now go forward uninterrupted. The Ephrata & Lebanon Traction Company operates the property of the Ephrata & Lebanon Street Railway.

The difficulty arose over the appointment of a receiver for one by the United States District Court and the appointment of a different receiver in a local court for the other concern. Recently the contending lawyers appeared before Judge Witmer in the United States District Court at Harrisburg, and argued the legal points involved in the two receiverships.

Application had been made for an order vacating the receivership created by Judge Witmer some months ago in the appointment of Henry A. Albin, superintendent of the road, as a receiver for the traction company. It was suggested that that receivership be joined with the one for the railway company which had later been applied for in the local courts by Harvey Steckbeck, a local creditor, represented by S. P. Light, Esq., and in response to which Judge Henry appointed Walter C. Graeff, Esq., as receiver.

Under the agreement of counsel, in the presence of Judge Witmer, Mr. Albin's Federal receivership will continue, and Attorney Walter C. Graeff, Esq., and Henry Albin will be co-receivers of both properties.

Purchase Terms Restated

Misunderstanding of the terms under which the city of Toronto, Ont., will take over the lines of the Toronto Suburban Railway within the city has led to a statement being issued by the officials of the Hydo-Electric Power Commission setting forth the facts. The statement as now made is that:

> The Hydro-Electric Power Commission buys from the government the entire Toronto Suburban System by assuming the outstanding bonded indebtedness, amounting to $2,628,000. It is proposed to spend $352,000 on reconstructing the lines outside the city. This latter sum is to be financed by the issue of bonds by the commisssion to the amount of $150,000 and selling the lines within the city for $202,000.
>
> The amount of bonds to be issued by the commission is $2,628,000, plus $150,000, making a total of $2,778,000. The obligation which the city assumes is $2,778,000, not this amount plus $202,000.
>
> The city does not pay interest at the rate of 6 per cent, while the Hydro Commission issues its bonds at 4½ per cent. The city's bonds are only collateral security and the city pays interest only on $350,000.

Transit and Power Bills to Come Before New York Legislature

The Legislature of New York met on Jan. 4 and organized and received the Governor's message. Bills were introduced in the Senate only. The Assembly bills will go in next on Jan. 11.

A considerable number of public service commission bills have been prepared and are ready for introduction. There is such a mass of legislation at the present time, some of which has been introduced in the Senate officially, and some in the Assembly awaiting its first reading on Jan. 11 that it is impossible to analyze it for publication at this time.

The Governor in his message recommends the development of the surplus waters of the barge canal, with immediate attention to the development of Crescent dam and Vischer Ferry, where an expenditure of approximately $1,000,000 should be made immediately available. In this respect the Democratic minority has prepared for introduction a bill which is virtually the Democratic hydro-electric measure of 1913 and repealing the conservation water power bill of last year, which will in the offset steal the thunder of the message. On the other hand the administration is to introduce amendments to its water power bill of 1921.

The Democrats are proposing to abolish the transit commission in New York City and to create separate public service commissions in each of the first and second class cities, and to continue the present public service commission as a state function over what is left, except in the city of New York, where the Board of Estimate and Apportionment would name a transportation department for the city of New York.

Ottawa Rejects Municipal Ownership

The questions of municipal ownership and service-at-cost were overwhelmingly defeated at the polls by Ottawa electors on Jan. 2. The vote strongly favored an extension of the company's franchise. The official figures follow:

For municipal ownership, 6,003; against, 8,430.

For extension of franchise, 8,415; against, 6,070.

For service at cost, 3,345; against, 10,639.

Orders Third-Rail Line Sale

Federal Judge Evan A. Evans on Dec. 23, 1921, ordered the sale of the third-rail division of the Aurora, Elgin & Chicago Railroad, Aurora, Ill. Though no date was set for the sale, it is stated that in all probability it will take place about March 1. This order separates the third-rail line from those in the Fox River division. The bondholders of the third-rail division are willing to purchase the line and have agreed to issue $1,000,000 of bonds and to invest the proceeds from the sale of these bonds in new equipment, new property, additions, extensions and improvements. This was the statement of Attorney B. P. Alschuler, who is representing Judge Evans.

Municipal Railway Traffic Increasing

According to D. W. Henderson, general superintendent of the Seattle (Wash.) Municipal Railway, the number of passengers on the municipal lines is steadily increasing, due, it is believed, largely to increasing industrial activity in the city and improvement in employment conditions. Figures prepared by Mr. Henderson show that there was a gain of 6,670 passengers in November over September and a gain of 5,301 passengers in October over September. Mr. Henderson said the increases are most noticeable on lines operating into the south industrial district, where more workers are being carried daily. The revenues for November were $514,248, and the total number of pay passengers 6,670,431, with a daily average of 268,938.

Market Street Railway Ready to Consider San Francisco's Offer

In reply to the inquiry which the Board of Supervisors of San Francisco, Cal., addressed to the Market Street Railway recently, Mr. Von Phul, president of the company, has replied that the sentiment of the stockholders is that "if the municipality desires to buy the properties it should have an opportunity to do so."

Mr. Von Phul's letter concludes with the suggestion that "representatives of the municipality be appointed by you (board of supervisors) to meet with representatives of this company to discuss values and details for the possible acquisition of the properties and to formulate a plan to be first submitted to the honorable board and, if approved by you, submitted to the stockholders of the company, and if approved by them, in turn submitted to the voters."

$23,152 Deficit on Seven and a Half Cent Fare

During the month of November the first month of the present 7½ cent fare period, the Cincinnati (Ohio) Traction Company had a deficit of $23,152, not including what would have been due the city on franchise tax, had not the tax been deferred.

This is shown in a financial statement submitted by the company to William Jerome Kuertz, Street Railway Director. The gross earnings from all sources during the month totaled $664.033; the total expenditures $687,186. The company was entitled to an earning of $33.913 on capital for the month, but received only $10,760. Director Kuertz said that increased patronage due to Christmas shopping would show a big increase in the earnings for December—probably enough to offset the November deficit.

Receiver Reports on Finances

The financial report of the receiver of the Lafayette (Ind.) Service Company shows for the period from Oct. 1, 1920, to Sept. 30, 1921, a deficit of $11,060. Details of the operating revenue and expenses are as follows:

Operating Revenue.	
Passenger service	$189,107
Freight service	3,409
Rent of tracks	11,444
Car privileges	747
Mail, express and miscellaneous	901
Energy sold	68,909
	$274,517
Operating Expenses	
Operating way and structures	35,530
Equipment	17,076
Power	108,575
Conducting transportation	90,640
General and miscellaneous	25,694
Taxes	8,062
	$285,577

Boston Elevated Doing Well

According to the *Wall Street Journal* the Boston (Mass.) Elevated Railway for the calendar year 1921 will show operating revenues of about $33,200,000, and balance, after rentals and interest, of about $3,443,000 available for dividends on West End and Boston Elevated stocks. The road has earned this calendar year a surplus after all dividends of about $426,000. Despite the undoubted depression in industry, plus the further adverse effect upon receipts of the opening up of 5-cent fare routes, the Boston Elevated Railway in the 1921 year will come within $550,000 of equaling the largest gross income total in its history. Operating revenue for 1920, the record year, was $33,750,860.

Issuance of Receiver's Certificates Disapproved

Judge A. B. Anderson, Indianapolis, in the federal court, has declined to approve a plan presented by R. W. Levering, receiver, for the rehabilitation of the Lafayette (Ind.) Service Company, by the issuance of receiver's certificates. The plan was opposed by bondholders who have brought a foreclosure suit in the federal court against the service company. Judge Anderson said that he did not wish to approve the receiver's plan unless there were agreement between the receiver and the bondholders.

The receiver suggested the sale of eighteen and one-half acres of land east of the Soldiers' Home at Lafayette, and the sale of the company's power plant for $50,000. He spoke of jitney competition between Lafayette and West Lafayette, saying that the jitneys were carrying 50 per cent of the passengers between the two places and were seriously cutting into the most remunerative business falling to the service company. He said he had asked the City Council of Lafayette and the town board of West Lafayette to pass anti-jitney ordinances.

The Real Estate Trust Company, Philadelphia, trustee, representing the bondholders, filed an answer to the receiver's petition objecting to the plan as being one not likely to bring a fair return on the property.

Financial News Notes

Loss Reported in Hamilton.—Since Jan. 1, the Cincinnati & Dayton Traction Company, Hamilton, Ohio, has lost $43,083, while in the past years the city lines averaged a profit of $30,000. The reasons for the loss as given by G. P. Sohngen, receiver of the property, were poor equipment, bus competition and general business depression.

$2,700,000 of Bonds Offered.—Lee, Higginson & Company, Boston, Mass., are members of a syndicate offering $2,700,000 of five-year 6½ per cent gold bonds of the West End Street Railway, which is to be consolidated with Boston Elevated Railway on June 10, 1922, under the provisions of an act passed in 1911. The bonds are dated Feb. 1, 1922, and are due on Feb. 1, 1927. They are issued to refund a like amount of bonds which mature on Feb. 1, 1922.

$3,800,000 of Refunding Bonds Offered.—Halsey, Stuart & Company, Inc., New York, N. Y., are members of a syndicate which is offering for subscription $3,800,000 of first and refunding thirty-year 6 per cent gold bonds of the San Antonio (Tex.) Public Service Company. The bonds are known as Series "A," due Jan. 1, 1952, The offering price is 98½ and interest yielding about 6.10 per cent. The management of the company is under the direction of the American Light & Traction Company.

$79,108 Gain in November.—The report of the Third Avenue Railway, New York, for November and five months ended Nov. 30, shows operating revenues of $1,139,368, an increase of $79,108, while the operating income was $205,661, showing an increase of $84,063. The net income, after deducting fixed charges, including full interest on the adjustment income 5 per cent bonds, was $6,460, compared with a net deficit of $81,801. For the five months ended Nov. 30 the operating revenues were $5,946,603, showing an increase of $306,040, while the operating income was $1,027,572, an increase of $285,669. The net income, after deducting fixed charges, including the full interest on the adjustment income 5 per cent bonds, amounted to $19,321, compared with a net deficit of $285,108.

Earnings Improve at New Orleans.—Announcement is made that the net earnings of the New Orleans Railway & Light Company, New Orleans, La., for August, 1921, were $222,002. This amount is exclusive of operating expenses, taxes, and the renewal and replacement reserve; and hence represents a return of 6 per cent on the valuation of $44,770,000, placed upon the property of the company under the Maloney plan of settlement, to which the Commission Council of New Orleans is committed. The September net earnings were $255,036, a return of 6.8 per cent. The report carries with it the announcement that the new equipment for the power house and rearrangement for the electric light and power wires will cost approximately $1.140.000. An additional sum of $545.000 is to be spent for the reinstallation of the distributing system.

Traffic and Transportation

Traffic Commission Appointed in Philadelphia

A traffic commission composed of men active in the motor vehicle and business fields has been appointed, at the suggestion of Mayor Moore, of Philadelphia, Pa., by Alba B. Johnson, president of the Philadelphia Chamber of Commerce. The commission will study the problems of handling vehicular traffic and suggest necessary legislation to improve conditions. It will be of an advisory character.

The commission is composed of David Kirschbaum, chairman; G. Herbert Taylor, who is chairman of the Chamber of Commerce Good Roads Committee; Walter Y. Anthony, Kane S. Green and Howard S. Roberts, of the same group; Elwood B. Chapman, of its Municipal Affairs Committee, and James Collins Jones, legal adviser of Chamber of Commerce.

Recently the Chamber of Commerce asserted that the handling of matters pertaining to traffic was in hopeless confusion and that only by reappointment of a traffic commission by Mayor Moore for the purpose of outlining and recommending a complete new set of rules for traffic regulations, with the necessary legislation noted, could conditions be improved.

Mayor Moore then wrote to Mr. Johnson the request that he name the commission to undertake this work. All of the members of the new body have been studying the city's traffic problems for years. As members of the two committees handling various aspects of this subject, they are thoroughly familiar with conditions here and in other cities. They will conduct conferences with police officials, engineers, motor vehicle men, electric railway experts and others so that all viewpoints can be considered.

Among the questions placed before the commission are parking, the one-way street, congestion around City Hall, designation of special streets for truck traffic and methods for safeguarding pedestrians.

When the commission has completed its studies and compiled its recommendations, together with the necessary ordinances to carry through the work, they will be presented to Mayor Moore for introduction into Councils if that course is necessary.

Early last year the Chamber of Commerce drew up an act covering this subject, and it was introduced into the Legislature, but failed to pass.

Increase in Receipts Under Five-Cent Fare Recorded

The Norwalk Division of the Connecticut Company has for the first time recorded an increase in receipts under the 5-cent fare trial period, the week of Dec. 11 showing a gain of $71 over the last week of the 10-cent fare, according to figures submitted to the Public Utilities Commission by Lucius P. Storrs, president of the Connecticut Company. Other figures show that the receipts in Bridgeport, Conn., are also gradually increasing under the 5-cent fare. "This is very encouraging," declared Richard T. Higgins, chairman of the Public Utilities Commission. "In the original order calling for a reduced fare it was pointed out that receipts were apt to increase rather than decrease under the new rate," continued Mr. Higgins.

96 Out of 100 Have Nickels Ready

Passengers using the stations of the Interborough Rapid Transit Company, New York, N. Y., where the turnstiles have been installed have formed the habit of carrying nickels, and the outgoing passengers have fallen as naturally into the habit of using the gates at the sides while the passengers entering the tubes make use of the middle gates. Tabulations made at a subway station where the turnstiles have been in use for some months show that now only four persons in a hundred go to the booths for change, where in times past long lines grouped before the windows caused delays. The other ninety-six persons carry their own nickels.

Elgin Cars Still Operate

While Mayor Arwin E. Price of Elgin, Ill., under direction of the City Council, has asked Bion J. Arnold, president of the Elgin & Belvidere Electric Railway, to show cause why the company cars are operating in the city without a franchise, and the Council has passed a resolution permitting the Aurora, Elgin & Chicago Railroad to operate its cars only for a "reasonable time," the committee of eighteen is still attempting to bring the Fox River Valley trouble to a satisfactory solution. The franchises expired on Dec. 10.

Federal Judge Evan A. Evans has presented to the committee, representing the towns through which the Aurora, Elgin & Chicago Railroad operates, what he considers the essential points in a contract between any or all of the cities and the company. They include the elimination of payments on pavements to be laid in the future except as already assessed against the company; payment by the traction company for all damage to pavements that may result from its use; elimination of all annual franchise payments, and elimination of street sprinkling.

The cities of Geneva, St. Charles, Batavia and Dundee wish to keep the franchises which they now have with the traction company, which do not exempt the company from paving payments. The company claims that traffic in these smaller towns is not sufficient to pay for the paving expenses.

Attorney Alschuler representing the company, announced that the company is considering a plan to reduce the rate of fare to regular riders approximately 1⅜ cents a ride, by keeping the straight fare at 10 cents for casual riders but selling tickets to regular riders at the rate of seven for 50 cents. This plan, he said, would be feasible only under an ordinance such as suggested by Judge Evans. The company is operating on a 3-cent per mile basis under an injunction issued in Judge Landis' court.

Free Fare Zone Eliminated

$400,000 Is Expected to Be Added Annually to Twin City Revenue Under Court Order

The free fare zone on car lines betwen St. Paul and Minneapolis will be abolished on Jan. 7. This action is expected to add between $250,000 and $300,000 to the revenue of the St. Paul lines and $150,000 to the Minneapolis lines annually.

The order follows a decision by Judge F. M. Catlin of the Ramsey County District Court making permanent an injunction against a 7-cent fare instead of 6 cents. Judge Catlin held the zone illegal. This means passengers traveling to St. Paul will pay a second fare at the city limits instead of at the half way point, as at present, at Snelling Avenue about 2 miles inside the St. Paul city limits.

The company is fortified by the Brooks-Coleman legislative act which placed determination of electric railway rates with the Minnesota Railroad & Warehouse Commission, and which specifies one full fare for each city.

The move was made by the railway as a measure toward saving the St. Paul City Railway from bankruptcy.

This neutral zone was established by a resolution adopted March 4, 1905, by the St. Paul Council, and accepted by the railway with the reservation of right to withdraw this acceptance.

Vice-President T. J. McGill said:

> The elimination of the free or neutral zone was necessary in view of the decisions of J. C. Michael and Frederick M. Catlin, of the District Court of Ramsey County.
>
> The St. Paul City Railway's revenues from November, 1920, to and including October, 1921, were approximately $300,000 short of paying actual operating expenses, taxes and interest on its funded debt.
>
> The decisions of the District Courts of Ramsey County above referred to deny the company any relief by increased fares which had been approved by the Railroad & Warehouse Commission after hearings as provided by the law under which the company operates. The actual loss has continued to increase during this period of litigation and the company must secure financial relief in order to escape ultimate bankruptcy.
>
> The company's 2,000 employees have loyally come to its support in accepting a wage reduction, but to furnish safe and convenient service to our car riders and pay operating expenses, fixed charges and a reasonable return to the owners of the property will require further additional net income.
>
> The decisions of the courts severely criticise continuance of the so-called free or neutral zone and require its elimination. The company therefore has no choice in the matter but to discontinue the zone, the maintenance of which is not required by any franchise obligation.
>
> The company, from the records on its fare boxes, read at the city limits, will have an exact account of all fares collected within the city limits of St. Paul. This method will eliminate the serious contentions now made on the part of officials of both Minneapolis and St. Paul that their respective cities are getting the worst of the accounting due to this zone.

Changed to Front-Entrance Cars.—Coincident with the change in the rule of the road to the right hand in Vancouver, Victoria and New Westminster, B. C., electric cars in Victoria and New Westminster are being operated as near-side or front-entrance cars. The former double door at the front is being used as the entrance and exit, the rear door being closed. This practice will become standard so that no change will take place when these cars are operated as one-man safety cars.

Milwaukee Company May Try Trolley Bus

The trackless trolley may be utilized by the Milwaukee Railway & Light Company, Milwaukee, Wis., in an effort to render service in an unserved territory for which rail extensions have been asked. A statement to that effect was recently made by John I. Beggs, president of the company, in an address before the South Side Civic Association of Milwaukee. If the suggestion meets with the association's approval and if permission can be obtained from the Milwaukee Common Council, the company will undertake to furnish trolley bus service on Lincoln Avenue and on Layton Boulevard, two streets on the south side for which rail lines have been asked.

Mr. Beggs admitted the necessity for transportation service on these streets, but declared that the company was unable to build these lines with present high costs and without some assurance that sufficient traffic would develop to support the rail lines. In connection with Mr. Beggs' address there was shown to the association a motion picture film of trackless trolley buses in operation in Detroit and at the Schenectady plant of the General Electric Company.

Supreme Court Reverses Commission's Decision

The Supreme Court of Utah has just handed down a decision which reverses the decision of the Industrial Commission of Utah in which it refused to assume jurisdiction in a case involving a damage suit against the Utah-Idaho Central Railroad on the ground that the line is interstate.

The Utah-Idaho Central is an electric railroad running from Ogden, Utah, to Preston, Idaho, but the Supreme Court holds that in the instance in question the Utah commission should have assumed jurisdiction. The Utah-Idaho Central connects with the Bamberger Electric at Ogden, which latter road runs south from Ogden to Salt Lake, there connecting with the Salt Lake & Utah, which runs south from Salt Lake to Payson, Utah. Neither the Bamberger Electric nor the Salt Lake & Utah Railway crosses the state line at any point.

The case decided by the Supreme Court was brought by the Utah Rapid Transit Company, which is the name under which the Utah-Idaho Central operates the local street car service in Ogden, Utah. The Industrial Commission and E. E. Gibbons are made defendants. Gibbons, a car carpenter, was injured while repairing a Utah-Idaho Central car at the joint shops of the two companies. The car could have been used in interstate traffic, but was out of service at the time of the accident, and was later returned to service in intrastate traffic.

Gibbons was standing on a ladder repairing the roof of this car when another car belonging to the Utah Rapid Transit, and therefore only intrastate in character, ran into the ladder on which Gibbons was standing. He fell, injuring his knee. Compensation was paid in the name of the street car company for eight weeks, but ceased when Gibbons refused to waive any claim he might have against the Utah-Idaho Central. He took the case to the Industrial Commission, which refused to assume jurisdiction, on the ground that the Utah-Idaho Central is an interstate carrier, and the car he had been repairing had been used interstate.

The Supreme Court reverses this on the ground that the railroad and the car alike are at times intrastate. The case will undoubtedly come before the United States Supreme Court for final decision.

Examination Before Special Master Adjourned Until Jan. 23

After a few hours' cross-examination of Richard E. Danforth, general manager of the Public Service Railway, Newark, N. J., the fare hearing before Special Master Haight adjourned on Dec. 23 not to convene again until Jan. 23. At that time five days will be devoted to testimony on the value of Public Service property.

The subject on Dec. 23 was depreciation. Mr. Haight interrupted at one point to say that the examination reminded him of the lawyer who, after arguing for an hour, asked the judge if he followed him. The judge's answer was:

> Yes, I follow you. And if I knew any way to get back where I started from, I wouldn't follow you any further.

Two important facts did, however, get before the master on Dec. 23. One was the statement by Mr. Danforth that he believed 90 miles of Public Service Railway track should be relaid at this time. Another was that labor was 81 per cent of the company's expense, exclusive of fixed charges and rentals. The statement was made that the Public Service Railway alone employs 7,700 persons.

Subsidiary Bus Company Formed

The Evanston (Ill.) West Side Railway has been organized to connect the west side with the center of the city. The company, which has a capitalization of $10,000, is subsidiary to the Evanston Railway. Practically 98 per cent of the stock of the new organization is held by Clement W. Smith, chief owner of the Evanston surface lines. The officers are Bertram W. Rosenstone, Harry J. Myerson and Oscar Ross.

The bus service is only temporary, according to an announcement of C. F. Speed, superintendent of the Evanston Street Railway, and railway lines will be built as soon as the people and the Council wish them. Transfers will be issued between the railway and bus lines.

Reduced Fares for 1922

Slight reductions in passenger fares on the Seattle-Tacoma interurban, effective on Jan. 1, were carried in tariffs filed with the Department of Public Works at Olympia. The reductions are occasioned by the wiping out of war tax on transportation which would have brought the fares to odd cents.

Still further reductions are made by the Puget Sound Electric Railway, Tacoma, Wash., to bring the fares to even amounts. Beginning Jan. 1, the one-way fare will be $1 with $1.60 for the round trip fare. Including the war tax, the fare has been $1.10 and $1.75.

The company's petition for reduction was granted without a hearing.

No Proof that Seven-Cent Fare Is Not Needed

Judge F. M. Catlin of the Ramsey District Court in making permanent, on Dec. 28, a temporary injunction preventing the St. Paul (Minn.) City Railway from putting into effect an order of the Minnesota Railroad & Warehouse Commission granting a 7-cent fare, filed findings with memoranda as follows:

> That no general or approximate valuation of its property, used, useful or reasonably necessary for street car purposes, was or is proved.
>
> That no emergency in fact, requiring more than the authorized 6-cent rate of fare, was or is proven, and the finding of the existence of such emergency by the Railroad & Warehouse Commission is not justified by the evidence, because—
>
> There was and is no proof of any economies which may have been resorted to by the railway to avoid insufficiency of net return from operation of its railway; nor that all items actually charged by the railway company to operating expenses for the first six months of the year 1921 or estimated for the past six months of said year, were necessary to or, on account of their nature, lawfully and properly chargeable to operation or maintenance of its railway system; nor that the salaries of general officers of the appellee corporation were and are reasonable under present circumstances, and no proof whatsoever of the specific salary of any general officer.

Order Establishing Eight-Cent Fare Upheld

The United States Circuit Court of Appeals of the Eighth District on Dec. 29 confirmed the order of the Federal District Court of Colorado granting the receiver of the Denver Tramway permission to establish an 8-cent fare and enjoining the city and county of Denver from interfering with the collection of the higher fare and from attempting to enforce the 6-cent fare, which was in effect prior thereto.

Only telegraphic advices had been received at Denver on Dec. 30 regarding the decision. It was apparent, however, that the two main contentions of the railway, namely, that the franchise is not a contract, and that if a contract could be shown to exist it would be void for lack of mutuality, were upheld by the higher Court.

Boston Elevated Announces More Five-Cent Areas

The Boston (Mass.) Elevated Railway is constantly reducing fares. Wherever it finds an opportunity to serve a section without impairing its total revenue it introduces the 5-cent fare for a limited haul. It has been doing it periodically for about two years, so that there are 5-cent fare zones all over its system.

The following areas have recently been announced as 5-cent areas, to become effective on Jan. 28, 1922:

> Lake Street-Commonwealth Avenue between Lake Street and Braves Field.
>
> Newton - Brighton - Watertown between Watertown and Braves Field.
>
> Clarendon Hill - Somerville Avenue between Clarendon Hill and Lechmere Square.
>
> Clarendon Hill - Highland Avenue between Clarendon Hill and Lechmere Square.
>
> Chestnut Hill - Ipswich Street between Chestnut Hill and Francis Street.
>
> Lake Street-Washington Street, Brookline between Lake Street and Francis Street.
>
> Jamaica Plain-South Huntington Avenue between Jamaica Plain and Francis Street.
>
> Harvard Square - East Cambridge between Harvard Square and Lechmere Square.

City Charges Property Overvalued

At the rehearing before the Public Service Commission on the proposed 8-cent fare for the Eugene-Springfield, Ore., system, City Attorneys Foster and Potter of Eugene and Springfield respectively charged an over-valuation of the property.

The lines are operated by the Southern Pacific Company. The railway contends that the lines are being operated at a loss.

It was pointed out by the city that the property was valued at $665,000 and that the company was only paying taxes on $140,000 of taxable properties. The city also complained of unnecessary trackage.

Danger Signals Installed for Accident Prevention

The Indiana Service Corporation, Fort Wayne, Ind., has received a shipment of the new uniform danger signals which are to be placed at all grade crossings on public highways throughout the state. As soon as the weather permits the work of installing these signs will begin.

According to an act passed early in 1921 by the state Legislature and approved by the Governor on March 10, additional uniform danger signals must be installed and maintained on all highways crossing steam or interurban railroads at a distance of 300 ft. each way from the intersection.

The signs are to be installed on the right-hand side of the road and in both directions from the crossing. This new system will give motorists ample warning that they are approaching a crossing at least 300 ft. before reaching it, and the signs are, therefore, expected to reduce accidents materially.

Superintendent of Railway May Decide Jitney Question

The determination as to whether jitney buses from the Cowen Park district will again be allowed to resume operation in competition with the Seattle (Wash.) Municipal Street Railway may be allowed to rest with Superintendent of Railways D. W. Henderson, following the action of the council in referring to him for report the entire matter. Residents of Cowen Park district have petitioned the City Council for through jitney service from the district to the downtown section, with the privilege of loading and unloading passengers at all points north of the Eastlake Bridge. Mayor Hugh M. Caldwell has written the Council, recommending that through service be allowed for the Cowen Park jitneys.

The effort to restore jitney service is made by Cowen Park residents because it is anticipated that the feeder buses now connecting with the municipal railway at Eastlake Bridge may be discontinued shortly, as they are running at a loss. Another objection to the feeder service is that the transfer privilege is not universal on the electric railway,—that is, passengers on the jitneys must pay a 10-cent fare with transfer to the Eastlake car line, but cannot transfer to any other line of the traction system. Thus, persons boarding the jitneys in Cowen Park are compelled to pay 18½ cents if they desire to ride further than the city terminus of the Eastlake line.

The Council is divided on the question of granting jitney service to the Cowen Park district, some of the Councilmen feeling that it merely means the reviving of the jitney problem throughout the city, as many other districts are without adequate street car service, and they would speedily demand jitney service similar to that furnished the Cowen Park residents.

Request to Compel Fare Advance Refused

The application of the New York, Westchester & Boston Railway, New York, N. Y., for a mandamus to compel the Transit Commission to render an immediate decision on the railway's request for permission to charge 7 cents instead of 5 within the city limits has been dismissed by Justice Burr of the Supreme Court.

Argument upon the application for the writ of mandamus was heard on Nov. 29. At that time counsel for the railway said the company had accumulated a deficit of $1,686,000 and that an increase in fare of 2 cents would cost the patrons in this city only $20,000 a year but would greatly aid the company in its efforts to make both ends meet. Counsel said that the Transit Commission had apparently pigeonholed its application. He wanted the court to stir up the commission by a mandamus.

Assistant Corporation Counsel George H. Stover, on behalf of the commission, said that it was then at work upon a report and hoped to have it ready early in January.

Justice Burr in dismissing the railroad company's application for a mandamus, said:

> A judicial body like the Transit Commission has discretion as to when and as to what it will decide, and the courts will not coerce this discretion by mandamus in the absence of facts showing that the discretion has been abused.

Justice Burr said that the failure of the commission to make a prompt decision in the present case was clearly excusable.

"Green Line Topics" Makes Debut

"Green Line Topics," first of a series of educational bulletins issued by the South Covington & Cincinnati Street Railway, made its appearance on Jan. 1. Conductors distributed copies among passengers on the cars throughout the day.

"We intend to inform you of our plans, our hopes and our troubles. There has, we believe, been too much fog, misstatement and misunderstanding, so we mean to talk to you in man-to-man fashion," reads one of the opening paragraphs in the bulletin. The bulletin informs the patrons regarding the amount of material required in the construction of the Green Line.

Wants to Run Three-Car Train

The Boston (Mass.) Elevated Railway has in contemplation taking all the surface cars out of the Boylston Street subway and introducing the three-car train, which would provide much additional seating capacity and greatly facilitate the handling of passengers at such congested points as Park Street and Scollay Square.

Transportation News Notes

Railway Starts Bus Line.—The Minneapolis Street Railway has started bus service between the terminus of its Second Street N. E. line and Camden Place. Transfers will be issued to and from the cars connecting with the bus route. The fare is 6 cents.

One-Man Cars Allowed.—The Illinois Commerce Commission recently handed down a decision authorizing the Tri-City Railway to operate one-man cars in Rock Island, Moline, East Moline and Silvis. As a result of the ruling one-man cars were being operated on the Third Avenue line between Rock Island and Moline on Dec. 26.

Wants Jitney Measure Repealed.—Lew Shank, Indianapolis Mayor-elect, has announced that he will advocate the repeal, in his administration, of an ordinance, recently passed, to regulate jitney traffic. He said he will inform officials of the Indianapolis Street Railway that he is willing to co-operate with them in efforts to establish a zone fare system for the railway.

Employees Not on Duty Must Pay.—D. W. Henderson, superintendent of the Seattle (Wash.) Municipal Railway, has issued an order that only trainmen going to and from duty may ride free on the municipal railway after Jan. 1. Hitherto, under the existing fare ordinance, all employees have been accorded this privilege. The saving to the city under this order is estimated at $100 a day.

Through Rates Cancelled.—The Interstate Public Service Company, Indianapolis, Ind., has issued a tariff cancelling its through freight rates to points on the lines of the Ohio Electric Railway. This will mean an increased cost on electric rail shipments from Louisville to Ohio territory. The action is the result of the Ohio Electric Railway's making void the through rate agreement.

One-Man Cars On Trial in Dayton.—The Dayton Street Railway, one of the five lines operating in Dayton, Ohio, will institute experimental operation of one-man cars in the near future. Provision for the operation of this type of cars was made in an ordinance just passed by the City Commission. The ordinance provides for the operation of either one-man or standard cars, and sets forth the requirements as to safety devices and operation.

Transfer Exchange Required to Be Continued.—The New York Transit Commission has denied the application of the receiver of the Coney Island & Brooklyn Railroad, and the Nassau Electric Railroad, to discontinue the exchange of free transfers with the Van Brunt Street & Erie Basin Railroad. The application was denied upon the recommendation of Howard T. Kingsbury, counsel for the commission, who conducted the hearing, and who held that the petitioners had failed to prove that any financial loss had materialized to the company by reason of issuance of transfers at certain specified points.

Legal Notes

CONNECTICUT—*Duty to Trespassers on Tracks.*

Where trespassers on the track are to be expected, greater care to avoid injuring them is required than where they are not to be expected. In this case it was claimed that the company knew that drunken persons in all stages of intoxication were likely to be found on Saturday night upon or in dangerous proximity to the track along a certain section of the line, and that a constable was on the car especially to look out for such persons. In these circumstances, the court declared that the motorman was bound to keep a lookout for drunken men even if they were lying on the track, whereas otherwise the exercise of reasonable care might have included only their detection if walking on the track. [Carlson vs. Connecticut Company, 112 Atlantic Rep., 646.]

FEDERAL DISTRICT COURT—*Public Service Corporation Not Required to Operate at Continuing Loss.*

The public cannot require of a public service corporation the continued operation of its property under rates which would afford, not only no adequate return on the capital invested, but would entail a large continuing loss and the eventual exhaustion of the entire capital. [Charleston-Isle of Palms Traction Co. vs. Shealy et al., 266 Federal Rep., 406.]

GEORGIA—*Legislative Act and Assessment Could Not Impair Obligation of Former Ordinance Contract, Relieving Street Railway from Paying.*

Ordinance contracts, exempting a street railway from paying assessments and sanctioned by a subsequent legislative act, are valid and not illegal on the ground that they were unauthorized exceptions from payment of taxes or a surrender of the city's police power, so that a subsequent act requiring the company to pay part of the cost of paving and not referring to the former contracts, could not be so extended as to impair the obligation of the former contracts. [City Council of Augusta et al vs. Augusta-Aiken Ry. & Electric Corporation, 104 Southeastern Rep., 503.]

MASSACHUSETTS—*The Failure of a Conductor to Prevent Alighting Passengers From Crowding Is Not Negligence.*

A street car conductor was not negligent in failing to prevent passengers from crowding as they left the car, where there was no reason to expect anything unusually dangerous; the passengers not being disorderly or unruly or acting in such a manner as to call for any interference by the carrier or its agents. [Ritchie vs. Boston Elevated Ry., 131 Northeastern Rep., 67.]

MICHIGAN—*Testimony of Inability to Produce Witnesses Improper.*

In action for injuries in a collision, it was proper for the trial court to exclude from the evidence the written list of witnesses made by the conductor at the time of the accident, with testimony of inability to produce certain of the witnesses, because otherwise the impression might be created that the testimony of such witnesses, if produced, would have been favorable to the company. [Ninman vs. Detroit United Railway, 183 Northwestern Rep., 49.]

NEW JERSEY—*Passenger Injured While Walking Back to Station Held Not Entitled to Recover.*

A passenger was carried by his station but let off at another station and was given a ticket by the conductor to enable him to ride back to his station. Instead of so doing, he started to walk back on the private right-of-way of the railroad company and stumbled and fell, sustaining the injuries sued for. It was held that the railroad company was not liable for the injuries thus sustained as there was no casual connection between the injuries sustained and the act of the defendant company in not letting the passenger off at the right station. [Kelson vs. Public Service R. Co., 110 Atlantic Rep., 919.]

NEW YORK—*Doctrine of res ipsa loquitur is Applicable Only Where Instrumentality Causing Accident is Entirely Under Control of Defendant.*

Where plaintiff, an intending passenger, was injured while standing on a station platform by being struck by a bundle of newspapers thrown from a passing train by one who was not an employee of the railroad company, there was no assumption that defendant's negligence caused the accident; the doctrine of res ipsa loquitur applying only where the instrumentality through which the accident happens is entirely under the control of the defendant. [King. vs. Interborough Rapid Transit Company, 188 New York Sup., 700.]

PENNSYLVANIA—*Person Merely Deprived of a Method of Travel May Not Appeal from Grant of Permission to Railroad to Surrender Charter Rights.*

The only question to be determined by the trial court on petition of a railroad for permission to surrender its charter rights to operate a road over part of its line, is whether it may be granted without prejudice to the public welfare or to the creditors and in the interests of the corporators. Hence, a decree granting such permission may not be appealed from by a private individual merely because he will, by discontinuance of operation, be deprived of one of the ways previously used by him in traveling to and from his home, his grievance not being different in kind from that of the general public, but only in degree, so that he is not a person aggrieved. [Petition of Eastern Transit Company, 112 Atlantic Rep., 917.]

TENNESSEE—*Contributory Negligence of Beneficiary Bars Recovery.*

A mother, while driving an automobile in which her son and daughter were seated, collided with a car. The mother and daughter were injured and the son was killed. There was negligence on the part of both mother and motorman. Damages were refused to the mother on account of her negligence, but were awarded to the daughter and there was a judgment for $8,000 for the death of the son, the mother and daughter being beneficiaries. The court held, however, that as the mother was negligent, her share could not be collected, but the daughter could collect $4,000. [Anderson vs. Memphis Street Railway, 227 Southwestern Rep., 39.]

SOUTH CAROLINA—*Directions of Traffic Officer Not Controlling.*

There is no absolute duty on a motorman to obey the traffic officer's signal to cross a street without regard to existing circumstances, conditions or consequences, but he is required to stop, notwithstanding a signal to proceed, if in the exercise of reasonable diligence it is necessary so to do to prevent a collision. [North State Lumber Company vs. Charleston Consolidated Railway & Lighting Company, 105 Southeastern Rep., 406.]

TENNESSEE—*Contracts Not to Join Labor Union Not Contrary to "Public Policy."*

Individual contracts between a street railway company and its employees, whereby they agreed not to join any labor union during the term of their service, provided these contracts are not contrary to any provision of the state or federal Constitution or statutes or any rule of the common law, are not opposed to "public policy." The report of the National War Labor Board providing that the right of workers to organize trade unions and to bargain collectively "shall" not be denied, etc., and that employers should not discharge workers for membership in trade unions, does not invalidate agreements by employees not to join a union, or render them contrary to public policy, as "shall" is used in the sense of "should." [Nashville Railway & Light Company vs. Lawson, 229 Southwestern Rep., 741.]

WISCONSIN—*Boy Held Trespasser in Climbing Tower Carrying Electric Wire.*

Where boys often played in a field containing steel towers bearing electric wires to the knowledge of the owner, but had never climbed the towers beyond the first crossbars and the owner's employees had never seen them on the towers, a boy climbing one of the towers to a height of 30 ft. and there coming in contact with a high-tension wire was a trespasser, and the owner owed him no active duty to protect him, whether or not he was a licensee, while playing at the foot of the tower. [Bonniwell vs. Milwaukee Light, Heat & Traction Company, 182 Northwestern Rep., 468.]

Personal Mention

Assistant Manager Appointed in Detroit to Further Municipal Service

When the development of the municipal street railway system of Detroit, Mich., reached the stage where Mayor Couzens felt he could no longer keep in as close touch with it unaided as he desired, he sought someone who could relieve him of some of the responsibility to the people in carrying out the program of municipal operation. With this idea in view he recently appointed Ross Schram assistant general manager of the Detroit Municipal Railway.

On Mr. Schram will rest the responsibility of assisting the operating force of the municipal system to carry out the will of the people and of selling service in accordance with the Mayor's interpretation of the people's stand for municipal ownership. He will be the main point of contact between the administration and the operating organization.

Mr. Schram was born in Battle Creek, Mich., in September, 1888, and his first connection with Detroit affairs came when he was municipal representative for the Detroit *News*. This was after his graduation from the Detroit University School. Later he entered the automobile field and was connected with the Charles H. Fuller Company, advertising agents, Chicago, handling the Overland, and with the J. Walter Thompson Company, New York, Ford agents. He was also associated with the Packard Motor Car Company as editor of the Packard house organ. For two years he was an automobile dealer in Ottawa, Ont.

As secretary to Mayor Couzens from 1919 to 1921, he became familiar with the policies of the Mayor as regards municipal ownership. For the past two and one-half years he has also been secretary to the Street Railway Commission, including the time while the fight was on for the municipal ownership ordinance which was approved by the voters of Detroit.

The position which Mr. Schram fills is a new one created to meet the demands resulting from the rapid expansion of the municipal system. He does not claim any technical experience in the operation of an electric railway. His efforts will be directed mainly toward the furthering of the policy of the Mayor and the Street Railway Commission to sell the idea of service to every one connected with the electric railway organization.

G. S. Wills Is Now Managing Wheeling Traction Company

Announcement has been made by the officials of the Wheeling (W. Va.) Traction Company of the appointment of G. S. Wills as general manager. Mr. Wills has been connected with the Wheeling Traction Company as assistant to the vice-president for the past year and a half and succeeds C. P. Billings as general manager of the Wheeling Traction Company.

The recent acquisition by the West Penn Power Company of new light and power interests in West Virginia and the growth and development of the properties in Pennsylvania have resulted in the placing of new and added responsibilities upon Mr. Billings, which require that a part of his time be spent away from Wheeling. Mr. Billings will, however, continue to make his headquarters in Wheeling, and will also continue the general supervision of the Wheeling Traction Company as its vice-president.

Mr. Wills has been connected for many years with the West Penn Power Company in Pittsburgh.

Fielder Sanders Retires

Has Been Cleveland's Railway Commissioner During the Difficult Period Since 1916

Fielder Sanders, who has served as street railway commissioner of Cleveland, Ohio, for the past six years, retired from that position on Dec. 31. He has resumed the private practice of law and will specialize in public utility cases and franchise matters. It is understood that Mayor Fred Kohler's choice for the office is James W. Holcomb.

FIELDER SANDERS

Mr. Sanders' legal experience has been extensive. For some time he was chief assistant county prosecutor and in this position had charge of all civil matters. He thereafter became judge of a municipal court in Cleveland, and was serving in this post previous to becoming commissioner.

Mr. Sanders took an active part in matters pertaining to street traffic and railways during all his years of service. He assisted in drafting a national code of traffic principles and was the founder of an organization of electric railway commissioners in cities having service-at-cost franchises. Entering office in 1915, Mr. Sanders was the third commissioner in Cleveland since the Tayler service-at-cost franchise went into effect in 1910. His term of office extended during the difficult war period when rising costs of operation made necessary an increase in the rate of fare amounting to 100 per cent. The confidence of the public in Mr. Sanders and the management of the Cleveland Railway is attested by the fact that this 100 per cent increase in rate of fare was accepted by residents of the city with but little adverse comment.

During Mr. Sanders' term of office also the service-at-cost franchise was extended and renewed and the maximum rate of fare raised to 6 cents cash with a penny charge for transfer. In a recent statement he said that during the last six years the correctness of the principles of the Tayler grant had been proved, for it had adjusted itself to the trying circumstances of war conditions and carried the company through particularly bad conditions. One point which he considers in its favor is that it has kept the railway out of politics.

Just before leaving his office, Mr. Sanders, in a report to the City Council, made several formal recommendations, among them the suggestion that the Cleveland Railway use buses and that the company attempt to collect back income taxes which it has paid. Mr. Sanders was interested in the development of a rapid transit system for Cleveland and served on a commission to establish such service. The plan submitted to the city failed to win the approval of voters. Through extensive changes in routing, replacement of rolling stock and extensions of lines, the Cleveland service was bettered even during adverse times.

Mr. Sanders reported to the City Council the accomplishments of his office during the past six years, a digest of which was printed in the ELECTRIC RAILWAY JOURNAL for Dec. 31, 1921.

Walter W. Austin is the newly elected president of the Kansas Public Service Association. He has served for five years as secretary-treasurer of the association and was elected its president at the recent meeting at Hutchinson. Mr. Austin is the owner and operator of the Home Light & Power Company, operating at Cottonwood Falls and Strong City, Kan.

Dexter S. Kimball, dean of the College of Engineering, Cornell University, has been elected president of the American Society of Mechanical Engineers for the year 1922. Since 1911 Dean Kimball has been a member of the Council on Industrial Engineering, New York State Department of Education. He is also a member of the Society for the Promotion of Engineering Education and the Society of Industrial Engineers. He is vice-president of the Federated American Engineering Societies.

Joseph Johnson, who was chief of the transportation bureau of the Public Service Commission for the First District of New York from 1914 to 1917, was recently appointed commissioner of public works for Manhattan under Julius Miller, the new Borough President. Mr. Johnson has held many administrative positions in New York City. For the two years previous to his connection with the Public Service Commission he served as fire commission under Mayor Gaynor. He received this appointment after holding the office of deputy fire commissioner of New York from 1910 to 1912. Mr. Johnson began his career as a newspaper man. He was city editor of the Atlanta *Journal* in 1896 and served on the staff of the New York *American* from 1897 to 1901, and during the Spanish-American War Mr. Johnson was a war correspondent for that paper.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

1921 a Year of Price Reductions

Lowered Costs of Nearly All Materials for Electric Railways Have Failed to Stimulate Buying — Greatest Activity in Rail Purchases for Track Reconstruction—Motor Production at New Low Point

Hectic indeed have been the 365 days of 1921 for the electric railway purchasing agent and as lean have been the orders for equipment and material placed with manufacturers and jobbers. Hampered at every turn by lack of funds, their buying has been mostly of material for maintenance and rehabilitation work. This is borne out by the figure for the number of miles of track reconstructed, which was the largest since the data have been collected. New track laid is even less than that built last year, which, when considered with the amount reconstructed, shows the marked tendency of the electric railways to spend their available money for maintenance and not for expansion even when there is a decided necessity for such. New rolling stock purchased is the lowest in the history of the industry, but a large number of cars have been reconstructed. No definite figures can be given for rehabilitated rolling stock since there is no line of demarkation between maintenance and reconstruction. However, the marked tendency to keep old equipment in running condition rather than scrap it has been plainly in evidence during the past year.

The prospects for 1922 are the brightest and most hopeful that the industry has seen in five years. The only good thing about 1921 is that it has passed. Its showing would have been much more discouraging had it been called upon to assume its proper proportion of maintenance and renewal costs. This being true, it follows that 1922 and subsequent years will be called upon to bear burdens which should have been spread over the past five years. These burdens, too, will be much greater than if the work had been done at the proper time. In spite of this deferred maintenance the electric railways have been witnessing through 1921 an ever-increasing gap between operating expenses and income. They have also seen prices gradually come within reason, accompanied by deliveries on a normal pre-war basis.

This year likewise has a most promising and encouraging outlook for the manufacturer of rolling stock and supplies. Readjustment in labor and materials has made it possible to reduce quotations in nearly every line. Though wage scales are still at too high a level to allow a recession to pre-war prices, a consistent tendency toward reduction is noticeable. The fundamental commodities of steel and copper have both undergone severe drops in prices. Steel is now approximately 50 per cent higher than it was in 1913, while copper has passed its low point and there has been an advance in prices during the past few months as the result of a greater demand for the metal, coupled with a curtailment of production.

According to Albert F. Richey's "Prospectus of Indexes" electric railway materials have shown a drop of 89 points since September, 1920, when the index was 237, as compared with 100 in 1913, which was taken as the base year. Thus materials are but 58 per cent higher than they were in the prewar year of 1913. Manufacturers, as well as every master mechanic and maintenance of way superintendent, know that there exists a market that has been starved but which is soon to be revived. Undoubtedly they are also aware that the electric railways will put every available dollar into track and rolling stock material in the near future. Judging by the conditions of most properties, their belief certainly has considerable substantiation.

Electric railways have been quite active in the rail market during the past year. The most notable occurrence in this market by which they have benefited was the reduction of the price from $47 to $40 a ton. This figure is about $12 higher than the average figure for 1902 to 1915 and $17 lower than the peak reached in 1918. Steel rails were the last of the important steel products to succumb to the adjustment which the steel industry has experienced since the fall of last year. All the important products, including plates, beams, bars, billets and pig iron, have been sharply reduced from the prices which prevailed previous to the falling off in the demand for steel, but even in the face of the reduction in all of these products steel rails held their own until the latter part of October.

The standard T-rail business of mills at the present time is in much better shape than other classes of steel business. Around the first of the year sizable orders were placed, the buying coming early and largely at one time. The same is true of girder rail orders. A fair tonnage was ordered early. Though the tendency of electric traction companies has been to hold off buying until a tremendous potential need for girder rails has been created, no sensational buying resulted. Although the new track constructed during 1921 was about 30 miles less than that built in 1920, this difference is more than wiped out when it is considered that 615 miles of track were reconstructed last year, as compared with 361 during the previous year.

That there has been some activity in the field of track construction work is evidenced by several sizable orders for rails. The city of Detroit, Mich., Department of Street Railways placed an $800,000 order for rails and special trackwork early in the year. The United Railways of St. Louis reconstructed 32 miles of track which required the purchase of 5,000 tons of rail, and in all nearly $1,500,000 was spent in track rehabilitation there. The Chicago Surface Lines placed an order in July for 4,000 tons of girder rail, while the Toronto Transportation Commission bought a like amount, together with 500 tons of T-rail.

This trackwork of course necessitated considerable buying of railroad spikes, bolts and nuts. Producers during the early part of the year had accumulated a reasonable reserve supply, sufficient to make deliveries of all standard mate-

New York Metal Market Prices

	Jan. 4, 1922
Copper, electrolytic, cents per lb	13.50
Copper wire base, cents per lb	15.12½
Lead, cents per lb	4.70
Nickel, cents per lb	35.00
Zinc, cents per lb	4.85
Tin, Straits, cents per lb	32.37½
Aluminum, 98 to 99 per cent, cents per lb	19.00

Bituminous Coal Prices

	Jan. 2, 1922
Smokeless mine run f.o.b. vessel, Hampton Roads	$4.68
Somerset mine run, Boston	1.80
Pittsburgh mine run, Pittsburgh	2.15
Franklin, Ill., screenings, Chicago	2.10
Central, Ill., screenings, Chicago	1.93
Kansas screenings, Kansas City	2.50

Old Metal Prices—New York

	Jan. 4, 1922
Heavy copper, cents per lb	11.25
Light copper, cents per lb	9.12½
Heavy brass, cents per lb	5.37
Zinc, old scrap, cents per lb	2.67
Yellow brass, cents per lb	5.25
Lead, heavy, cents per lb	3.67
Steel car axles, Chicago, net ton	$15.75
Old car wheels, Chicago, gross ton	15.50
Rails (short), Chicago, gross ton	13.25
Rails (rerolling), Chicago, gross ton	12.75
Machine turnings, Chicago, net ton	3.75

Electric Railway Material Prices

	Jan. 4, 1922
Rubber-covered wire, New York, cents per lb	6.72
Weatherproof wire base, N. Y., cents per lb.	16.25
Standard Bessemer steel rails, per gross ton	40.00
Standard open hearth rails, per gross ton	40.00
Wire nails, Pittsburgh, cents per lb	2.50
Railroad spikes, drive, Pittsburgh base, cents per lb	2.25
Tie plates (flat type), cents per lb	2.00
Angle bars, cents per lb	2.40
Rail bolts and nuts, Pittsburgh base, cents per lb	4.12½
Steel bars, Pittsburgh, cents per lb	1.50
Sheet iron, (24 gage), Pittsburgh, cents per lb	2.85
Sheet iron, galvanized, (24 gage), Pittsburgh, cents per lb	3.55
Galvanized barbed wire, Pittsburgh, cents per lb	3.15
Galvanized wire, ordinary, Pittsburgh, cents per lb	2.75
Car window glass (single strength), first three brackets, A quality, N.Y., discount*	81%

	Jan. 4, 1922
Car window glass (single strength), first three brackets, B quality, N. Y., discount	81%
Car window glass (double strength, all sizes, A quality), New York, discount	83%
Putty, 5 lb. tins, cents per lb	4.75
Waste, wool, cents per lb	13.00
Waste, cotton, (100 lb. bale), cents per lb.	
White	10.00
Colored	9.00
Asphalt, per ton, f.o.b. Bayonne, N. J.	$16.00
Paving stone, 4x8x4, f.o.b. Chicago, dressed, per sq.yd	$3.35
Common, per sq.yd	$3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.17
Crushed stone, ¾ in. carload lots, N. Y., per cu.yd	1.85
Cement, Chicago consumers net prices, without bags	1.97
Linseed oil, (5 bbl. lots), N. Y., cents per gal.	72.00
White lead, (100 lb. keg), N. Y., cents per lb.	12.25
Turpentine (bbl. lots), N. Y., cents per gal.	82.50

*These prices are f.o.b. works, boxing charges extra.

rial from stock, but there was a growing tendency to curtail production. The reduction from peak prices of spikes and bolts to date has been considerable, ranging from about 20 to 40 per cent with different companies. The current base price of track bolts and nuts is about 3 cents per pound, while standard railroad spikes are from 3.8 to 4 cents per pound.

The prices of track tools also came in for revision. The reduction from peak prices by different producers ranged from 10 to 30 per cent. Although stocks were held to a low level immediate deliveries were made.

Special trackwork in the electric railway field showed quite an improvement during the year. Isolated and concentrated activity in a few sections of the country rather than a general improvement accounted for the increase in this buying. It was said that the street railways were more active than the steam railroads in this market. Orders, of course, represented pressing repair needs for the most part, rather than new track extensions.

Line Material Prices Undergo Several Reductions

The prices of overhead copper line material during 1921 have been marked with numerous reductions. There have been at least five increases in the discount, so that prices are roughly 25 per cent less than they were a year ago. Buying during the year was for maintenance only, with railways never endeavoring to stock ahead. Stocks of standard finished products and semi-finished material in this field are in good shape with prompt deliveries prevailing.

Car Wheel Production Low

A survey of the market among producers of chilled iron and rolled steel car wheels made in June revealed virtually a uniform condition of light demand. Both steam and electric lines were buying the smallest number of wheels possible to meet their requirements, orders were scattered and there were no large ones placed. Some manufacturers reported a production as high as 40 to 60 per cent of capacity, but the general operating scale was lower than it had been for many years. Nearly all wheel companies have reduced wages, though here and there one reported undiminished labor cost. The average decrease in wages has been from about 10 to 20 per cent, with an extreme of 25 per cent. Most producers are now selling wheels at a quotation approximately 25 per cent lower than a year ago.

Brake Shoe Prices Down

The price trend of brake shoes has been downward. Reductions have been made in several instalments so that they can now be purchased at about $16 less per ton than at this time last year. This is a substantial reduction when it is remembered that the brake shoes were advanced in price since before the war less than almost any other item of railway equipment. Buying, for the most part, was for immediate needs only, though in the electric railway field buying has been proportionately greater than in the steam railroad field, some traction companies carrying from two to three months supply. The market has presented much the same feature as other railway equipment lines. Stocks of finished material were maintained rather large and deliveries, of course, were immediate. Orders to equip new rolling stock were a negligible factor.

Railway Motor Production at Low Point

The sale of railway motors was not as gratifying last year as it was during 1920, especially during the first half of 1920. The bulk of the demand, of course, has been for motors of the safety-car type. The sale of motors began to show considerable falling off in the spring of last year. Even though the buying of this class of material has been subnormal for several years past, the present market appears to be especially below par. It was estimated recently that the demand during the year ran about 50 per cent below normal and about 25 per cent below the record for 1920. The fact that less than one-third the number of safety cars were ordered during 1921 than during 1920 helped account for this fact. On another page it will also be noticed that the total rolling stock ordered last year was approximately half of that purchased during the year previous. This decided slump in the demand for both safety and urban cars is reflected very forcibly in railway motor production.

Prices have come down from the peak, of course, the reduction in one instance amounting to from 10 to 20 per cent. Unless there are further decreases in labor and material costs no further price reductions are foreseen, especially while the necessarily curtailed production entails a high overhead. It can undoubtedly be said that motor manufacturers will be among the first to benefit when the electric railways begin to purchase badly needed rolling stock.

1921 a Year of Price Drops

The year 1921 has been one in which reduction has taken place in nearly every type of material and piece of equipment used by electric railways. It has been a case where price lowering has not been accompanied by increased buying. It would be useless to enumerate the various items in which reduction has taken place. In some cases the reductions are but 5 or 10 per cent, while in others they are as high as 40 or 50 per cent. A weighted average for all materials would probably indicate that the electric railway purchasing agent is buying the same amount of material now for 30 per cent less than he paid a year ago.

Rolling Stock

Philadelphia & Western Railway, Norristown, Pa., has ordered two 56-ft. center-entrance motor cars from the J. G. Brill Company, Philadelphia, Pa.

Johnstown & Somerset Traction Company, Johnstown, Pa., has placed an order for two double-truck motor cars with the J. G. Brill Company, Philadelphia. These cars will be built at the Kuhlman plant of the company.

Track and Roadway

Muskegon Traction & Light Company, Muskegon, Mich., has been improving the tracks and welding the rails.

Jackson Public Service Company, Jackson, Miss., is tearing up its tracks at the head of Capitol Street and is laying a new switch to replace the worn-out one.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., is constructing a 2-mile siding at Jones' station and will soon complete the block system on its lines. Ties have been replaced under much of the track, wires realigned and a uniform voltage of 1,200 has been adapted. Twenty-five additional telephones have been installed along the way. The equipment hereafter is to be regularly inspected.

Buffalo, Arcade & Wellsville Electric Traction Corporation, Buffalo, N. Y., is about to contract for all material necessary for the construction of an 81-mile high-speed passenger and freight line. A 650-volt direct-current system will be installed with converters taking their power from a three-phase, 25-cycle transmission line. The track will be laid with 65-lb. rail. Construction work will be commenced about March 1, 1922.

Dallas (Tex.) Railway and the Supervisor of Public Utilities are working out plans for electric railway extensions in Dallas, in keeping with the expansion and growth of the city. Extension of car tracks on Parry and Lindsley Avenues to Auburn and the utilization of the tracks of the Terrell Interurban, now building on Forney Avenue, for another approach to the Mount Auburn section of the city are the next developments under the plans now being worked out. It is expected that these two lines will be built and put in operation on the completion of the Terrell Interurban, which is expected to be finished about Nov. 1, 1922.

Power Houses, Shops and Buildings

Commonwealth Edison Company, Chicago, Ill., will build a power plant on the Indiana side of the state line north of Hammond. Power for the entire urban system of street railroads could be provided by this plant.

Vincennes (Ind.) Street Railway is installing two motor-generator sets to convert the power purchased from the Indiana Power Company to direct current. Heretofore, direct current has been supplied to the railway by the company. The machines are being installed in the carhouse on North Eighth Street.

British Columbia Electric Railway, Vancouver, B. C., is lengthening the station platforms on the Central Park line to a 75-ft. standard to accommodate three-car trains for some time in the future. The alterations are taking place at present owing to a number of stations being removed to new locations to conform to the new rule of the road which has just gone into effect. Stations are located on the near side of level crossings.

Trade Notes

Texas Company, New York, has consolidated its traffic and railway sales department into one department known as the railway and traffic sales department. The headquarters of G. L. Noble, vice-president; William Jervis, manager; W. E. Greenwood, assistant manager, is at 17 Battery Place, New York, which will also be the headquarters of J. E. Symons, superintendent of the lubricating division of the department.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has begun work on the largest single order for electrical transformers ever placed, according to announcement made by officials of that company. The order was received by the Westinghouse Electric International Company, through its Japanese agents, Takata & Company, from the Daido Electric Power Company of Japan. The contract calls for thirty-four transformers, averaging 9,400 kva. each, a total of 316,400 kva. The transformers will be single phase, 60 cycle, oil insulated and water cooled, and will have a high voltage of 154,000 volts, which is the highest voltage in commercial use at this time. When installed, they will weigh 50 tons each. The Daido Electric Power Company of Japan will install these transformers in a super-power system in the industrial district about Tokio. This super-power zone is similar to that now under consideration for the area between Boston and Washington. Eleven months will be needed to complete the order, which calls for an expenditure of approximately $2,000,000 for the entire equipment.

1922 1922

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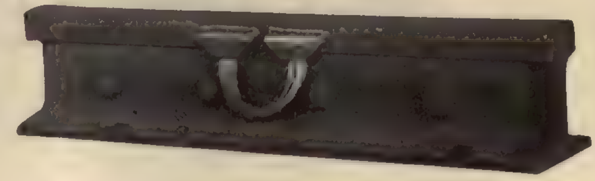

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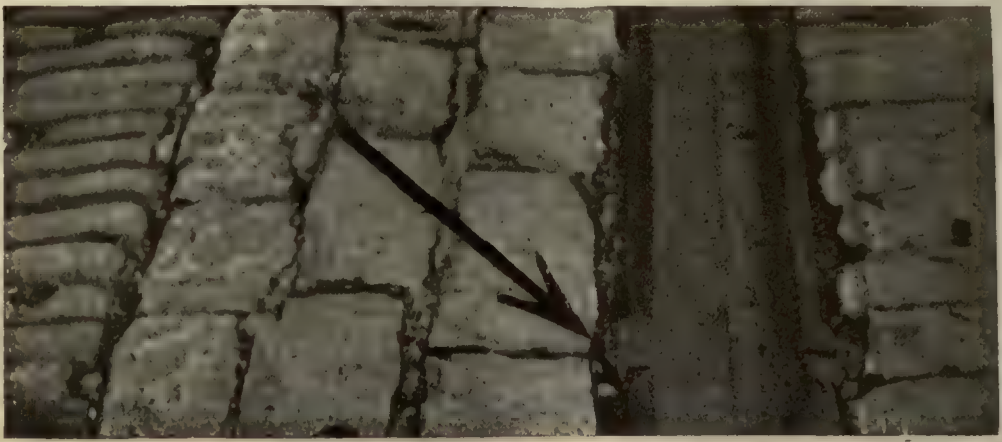

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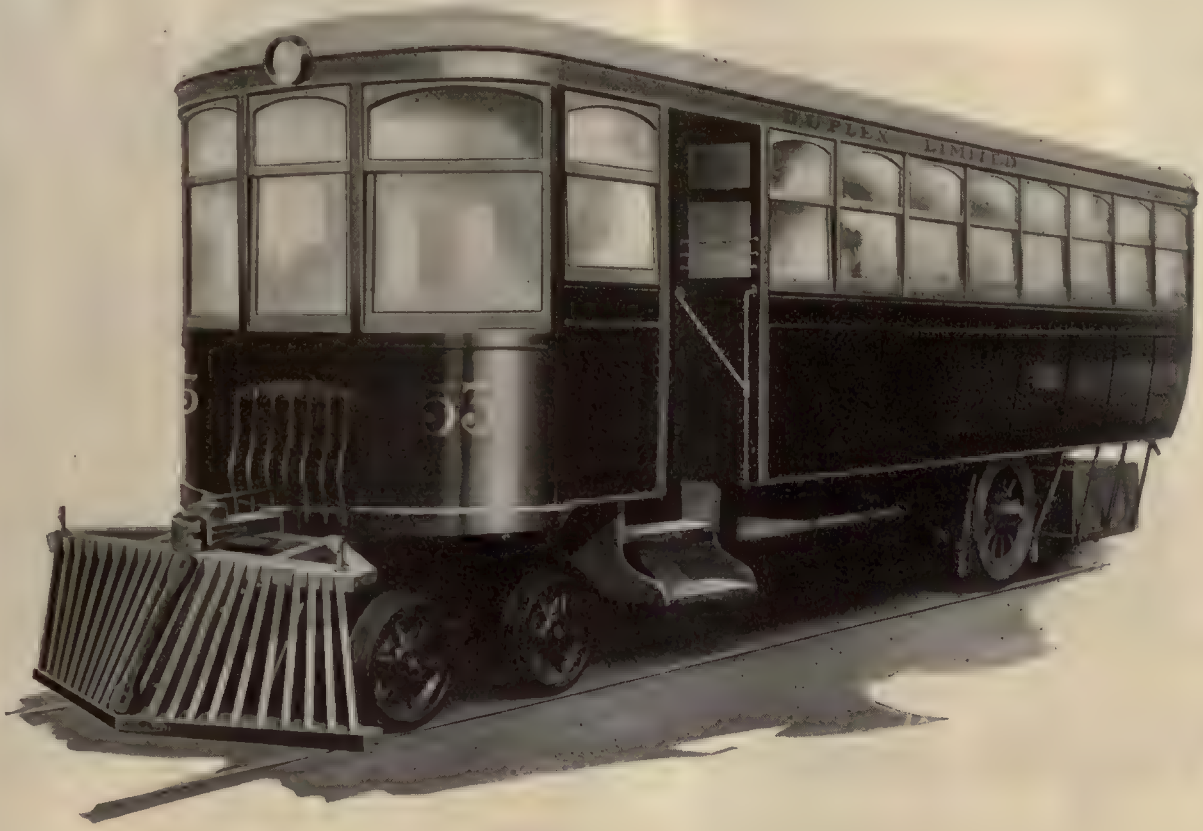

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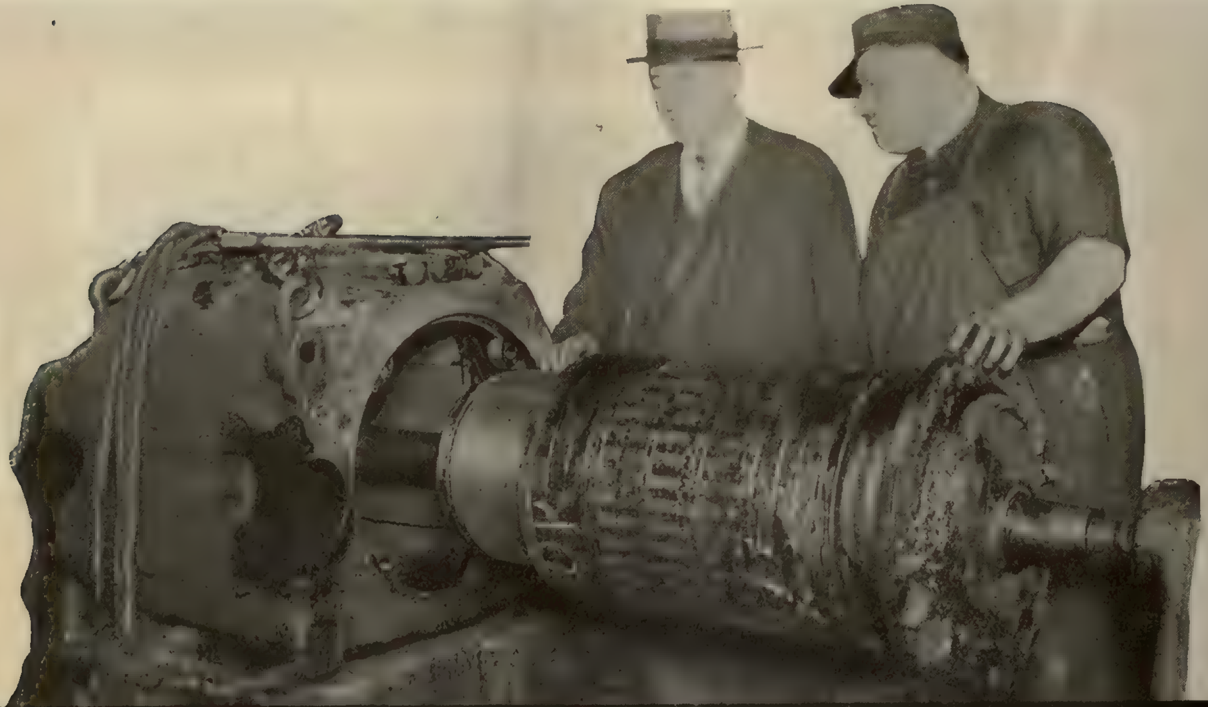

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The Sterling Varnish Company
Pittsburgh, Pa.

We are interested in cutting maintenance cost by dipping and baking, and would like to have your blueprints on this subject as well as upon general motor upkeep.

Name ....

MERITAS LEATHER CLOTH

For good seats and shades

FOR seats, Meritas Leather Cloth combines fine appearance and long life. Its leather-like surface is both pliant and tough, stands up against chafing, resists the staining action of liquids and can be quickly washed with water. Its sturdy foundation fabric holds its shape well without bagging.

The same qualities make Meritas the ideal material for shades—shades that can stay in good condition a long time regardless of wear and tear and exposure to weather.

Meritas is good because we make it complete in our own plants, weaving the foundation fabric from long staple cotton, and safeguarding every stage of manufacture to insure a first class product.

Meritas Leather Cloth is made in every grain, weight, color and finish required for railway service.

Let us send you samples

THE STANDARD TEXTILE PRODUCTS CO.
320 BROADWAY, NEW YORK
Dept. E. R. J.

MERITAS
STANDARD
STP
TEXTILE PRODUCTS CO.
BRAND
REG. U.S. PAT. OFFICE

DON'T DO ANYTHING UNTIL YOU GET OUR 1922 PROPOSITION

No longer any Question that MAXIMUM ECONOMY means

the "CONTINUOUS RAIL"

No longer any need of doubt as to selecting the cheapest and best method of making your tracks

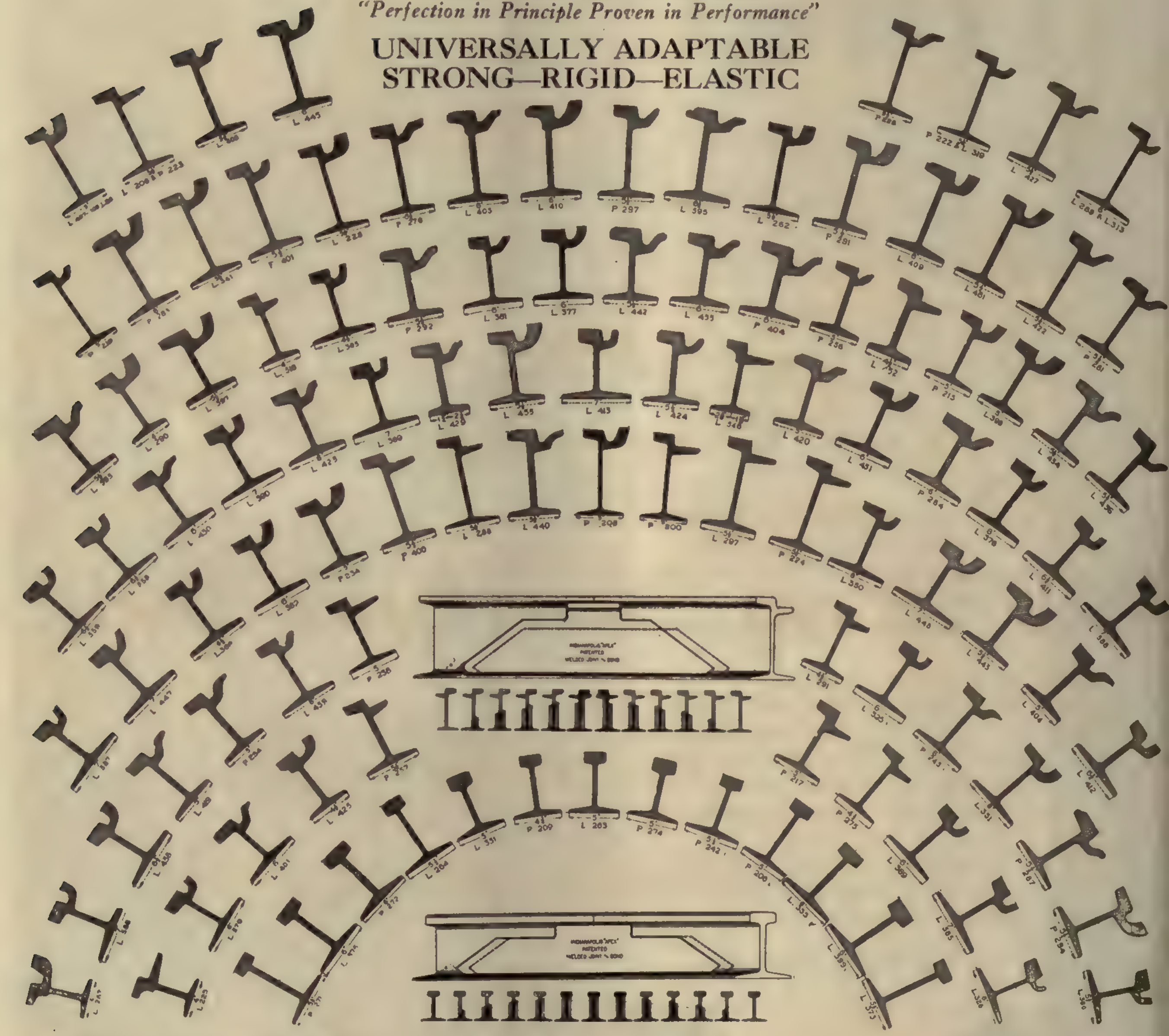
"CONTINUOUS RAIL" tracks.

"Indianapolis" Welded Joint and Bond Plates

On over 125 different rail sections in over 200 cities and towns.
in 48 States and Countries.
Through 10 years' time and test period.

"Perfection in Principle Proven in Performance"

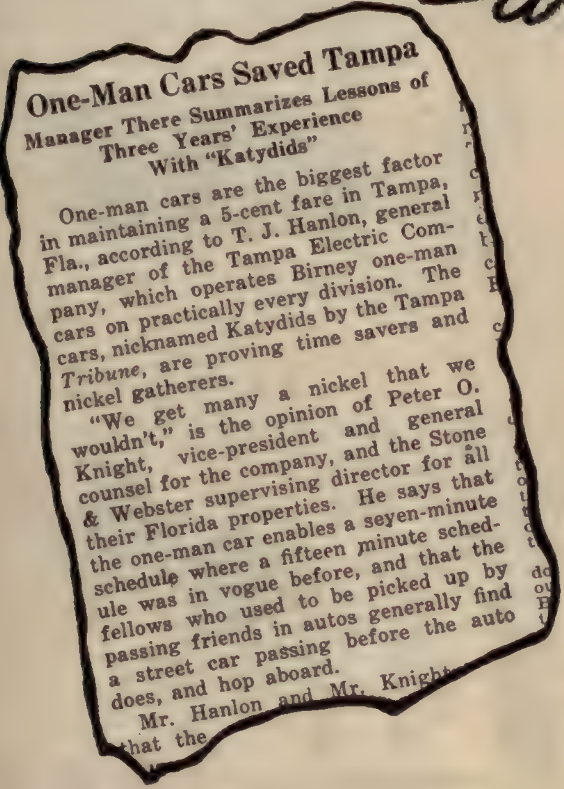
UNIVERSALLY ADAPTABLE
STRONG—RIGID—ELASTIC



Indianapolis Switch and Frog Company

Springfield,
Ohio

Some News of the Past —and the Future



One-Man Cars Saved Tampa

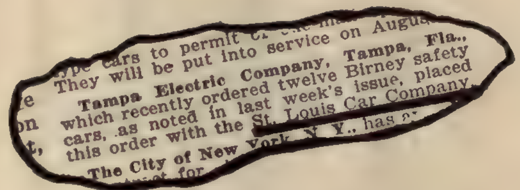
Manager There Summarizes Lessons of Three Years' Experience With "Katydids"

One-man cars are the biggest factor in maintaining a 5-cent fare in Tampa, Fla., according to T. J. Hanlon, general manager of the Tampa Electric Company, which operates Birney one-man cars on practically every division. The cars, nicknamed Katydids by the Tampa *Tribune*, are proving time savers and nickel gatherers.

"We get many a nickel that we wouldn't," is the opinion of Peter O. Knight, vice-president and general counsel for the company, and the Stone & Webster supervising director for all their Florida properties. He says that the one-man car enables a seven-minute schedule where a fifteen minute schedule was in vogue before, and that the fellows who used to be picked up by passing friends in autos generally find a street car passing before the auto does, and hop aboard.

Mr. Hanlon and Mr. Knight
that the

Items from last year's Electric Railway Journal



ype cars to permit
They will be put into service on Augu

Tampa Electric Company, Tampa, Fla., which recently ordered twelve Birney safety cars, as noted in last week's issue, placed this order with the St. Louis Car Company.

The City of New York, N. Y., has

Will 5-Cent Fares Come Back?

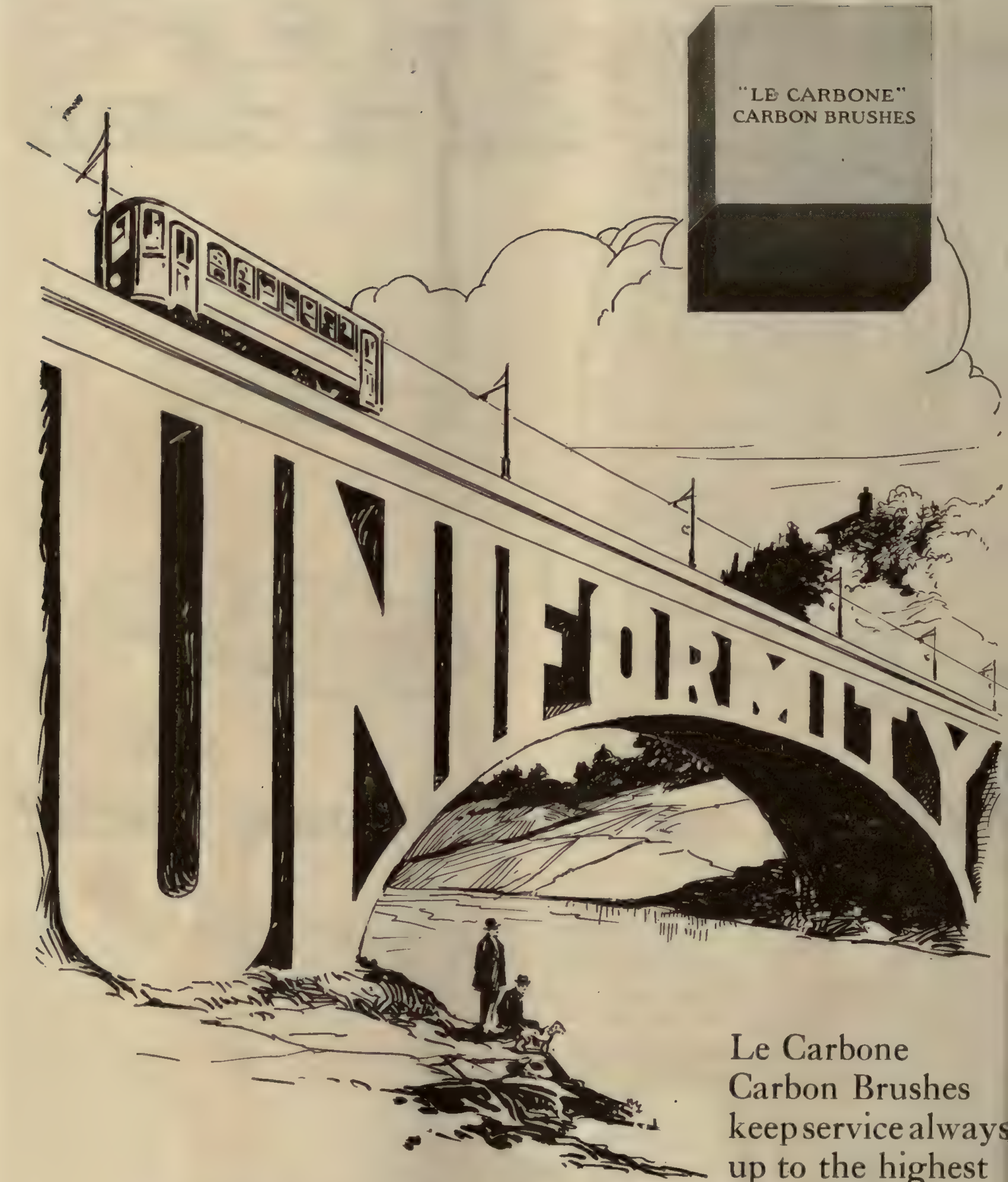
Frankly we think the tendency is toward a return to lower fares. In 1922 it's going to take a low fare, a quick ride and the car-in-sight class of service to win public favor, and to compete with the automobile, private or public. And it's going to require the most economical kind of a car to operate at a profit on this low fare basis.

What genuine safety cars are doing in Tampa, Florida, they will do for you.

Do you want to be convinced? Order enough safety cars to equip one line—*completely*. And be sure they are St. Louis Quality Cars.

St Louis Car Company
St. Louis, Mo.

"The Birthplace of the Safety Car."



Le Carbone
Carbon Brushes
keep service always
up to the highest
level.

W. J. Jeandron
229 Fulton Street, New York
634 Wabash Bldg., Pittsburgh
525 Market St., San Francisco

Lyman Tube and Supply Co.,
Toronto and Montreal, Canada

DUFF JACKS

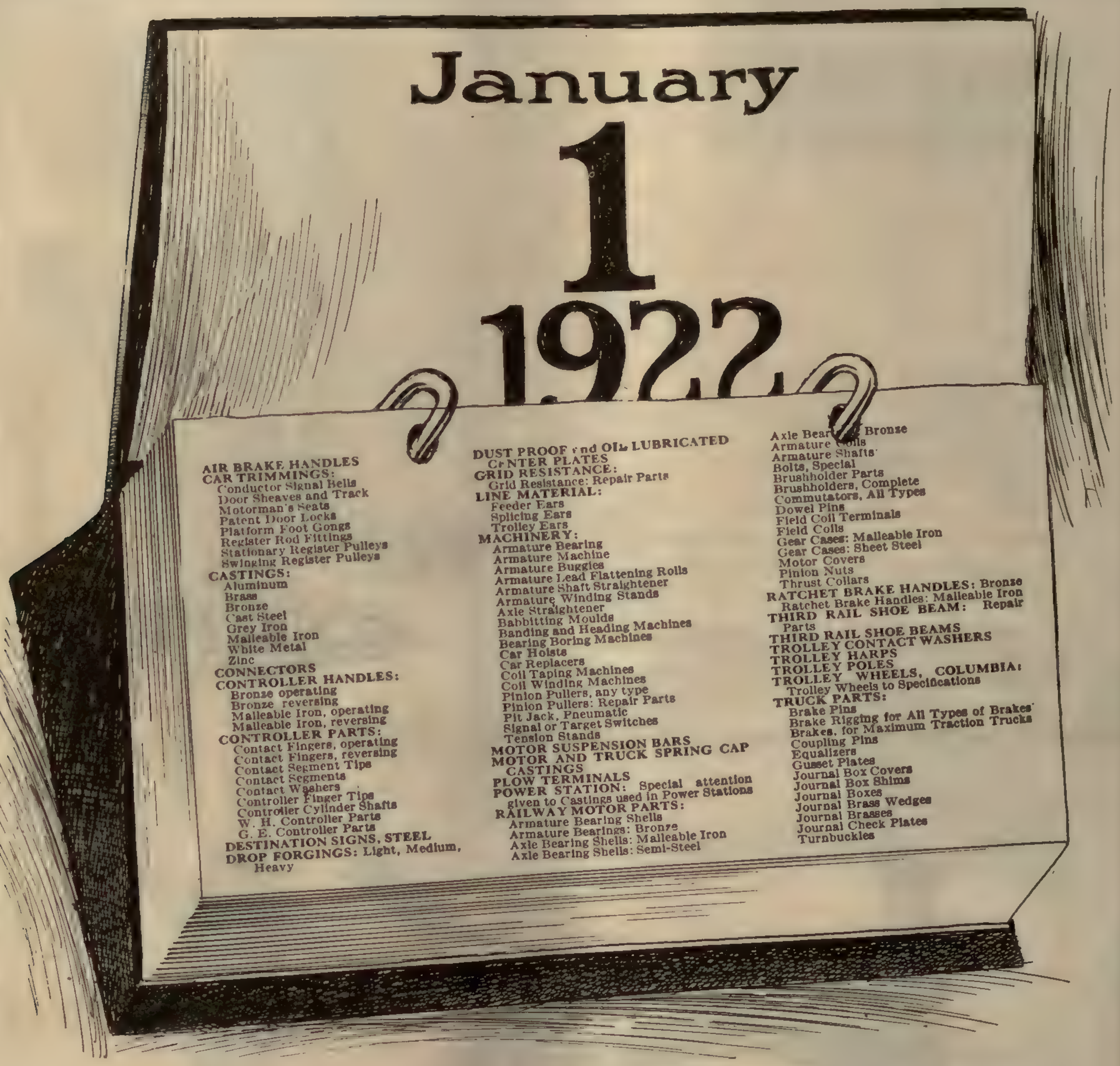
Always ready to "give you a Lift"

No type of jack is so extensively used by electric railways as the Duff No. 239 with forged steel claw hung on a swivel head. It is the sturdiest, most reliable and convenient emergency jack devised for electric railway cars. As originally designed, some eight years ago, it has proven so absolutely satisfactory as to have remained the standard, practically without changes of any kind.

Below are illustrated three other Duff Jacks of 15 tons capacity, which have become standard in repair shops everywhere.

The Duff Manufacturing Co.
Est. 1883. Pittsburgh, Pa.

The Time Has Arriv



AIR BRAKE HANDLES
CAR TRIMMINGS:
  Conductor Signal Bells
  Door Sheaves and Track
  Motorman's Seats
  Patent Door Locks
  Platform Foot Gongs
  Register Rod Fittings
  Stationary Register Pulleys
  Swinging Register Pulleys
CASTINGS:
  Aluminum
  Brass
  Bronze
  Cast Steel
  Grey Iron
  Malleable Iron
  White Metal
  Zinc
CONNECTORS
CONTROLLER HANDLES:
  Bronze operating
  Bronze reversing
  Malleable Iron, operating
  Malleable Iron, reversing
CONTROLLER PARTS:
  Contact Fingers, operating
  Contact Fingers, reversing
  Contact Segment Tips
  Contact Segments
  Contact Washers
  Controller Finger Tips
  Controller Cylinder Shafts
  W. H. Controller Parts
  G. E. Controller Parts
DESTINATION SIGNS, STEEL
DROP FORGINGS: Light, Medium, Heavy

DUST PROOF and OIL LUBRICATED CENTER PLATES
GRID RESISTANCE:
  Grid Resistance: Repair Parts
LINE MATERIAL:
  Feeder Ears
  Splicing Ears
  Trolley Ears
MACHINERY:
  Armature Bearing
  Armature Machine
  Armature Buggies
  Armature Lead Flattening Rolls
  Armature Shaft Straightener
  Armature Winding Stands
  Axle Straightener
  Babbitting Moulds
  Banding and Heading Machines
  Bearing Boring Machines
  Car Hoists
  Car Replacers
  Coil Taping Machines
  Coil Winding Machines
  Pinion Pullers, any type
  Pinion Pullers: Repair Parts
  Pit Jack, Pneumatic
  Signal or Target Switches
  Tension Stands
MOTOR SUSPENSION BARS
MOTOR AND TRUCK SPRING CAP CASTINGS
PLOW TERMINALS
POWER STATION: Special attention given to Castings used in Power Stations
RAILWAY MOTOR PARTS:
  Armature Bearing Shells
  Armature Bearings: Bronze
  Axle Bearing Shells: Malleable Iron
  Axle Bearing Shells: Semi-Steel
  Axle Bear[illegible] Bronze
  Armature Coils
  Armature Shafts
  Bolts, Special
  Brushholder Parts
  Brushholders, Complete
  Commutators, All Types
  Dowel Pins
  Field Coil Terminals
  Field Coils
  Gear Cases: Malleable Iron
  Gear Cases: Sheet Steel
  Motor Covers
  Pinion Nuts
  Thrust Collars
RATCHET BRAKE HANDLES: Bronze
  Ratchet Brake Handles: Malleable Iron
THIRD RAIL SHOE BEAM: Repair Parts
THIRD RAIL SHOE BEAMS
TROLLEY CONTACT WASHERS
TROLLEY HARPS
TROLLEY POLES
TROLLEY WHEELS, COLUMBIA:
  Trolley Wheels to Specifications
TRUCK PARTS:
  Brake Pins
  Brake Rigging for All Types of Brakes
  Brakes, for Maximum Traction Trucks
  Coupling Pins
  Equalizers
  Gusset Plates
  Journal Box Covers
  Journal Box Shims
  Journal Boxes
  Journal Brass Wedges
  Journal Brasses
  Journal Check Plates
  Turnbuckles

Columbia Machine Work

Atlantic Ave. & Chestnut S

ed to Replenish Stock

Last Year's Books are Closed

There's nothing to be gained by running longer with a depleted store-room. The year 1921 is past, the books are balanced, and the showing is made. Now let's go for 1922.

Prices have fallen from the abnormal peaks of a year ago but a spurt in buying might cause them to harden again. There's no time like the beginning of the New Year, to take account of stock, and lay in a reasonable supply of the more commonly used parts. Look over the list on the opposite page and check off the items you will soon be needing.

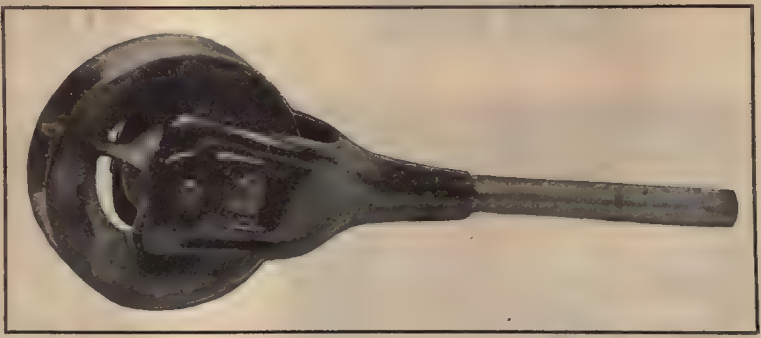
COLUMBIA

Remember that Columbia materials and products are manufactured by a concern of many years' experience in supplying railway requirements. At present about ninety per cent of our large output is shipped to electric railway companies.

We are always prepared to produce on short notice, special castings, forgings or machine tool jobs, to your own blueprints and specifications.

Write for today's prices on

Gear Cases
Bearings
Line Materials
Trolley Parts



nd Malleable Iron Co.

ooklyn, New York

U-RE-LITE
if it isn't an I-T-E it isn't a U-RE-LITE

Go Ahead!

Don't Let Production Pause for Blowing Fuses

Blown fuses may mean only a few moments delay each time while someone hunts up and installs new ones. But the pay roll keeps right on mounting-up, while no productive work is being done. And then, too, there's the cost of the fuses themselves.

The U-re-lite is a switch and circuit-breaker combined, eliminating troublesome fuses—a money-saver and a time-saver for every shop. When an overload or "short" occurs, the U-re-lite opens the circuit instantly. A turn of the wrist is all that's needed to close it again. Cuts fuse expense 100% and eliminates delays.

PASSED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS

Made in various sizes and capacities up to 200 amperes for A.C. and D.C. circuits. Adjustable over a wide range above and below normal rating, as shown on the nameplate.

"First to the left, then to the right,
Turn the handle and U-RE-LITE"

The CUTTER COMPANY
ESTABLISHED 1888 PHILADELPHIA

PEERLESS INSULATION

A standard is usually more difficult to sustain than to set.

Peerless insulating paper is exceptional in that it has uniformly more than lived up to the greatest expectations of its users.

In electrical resistance it is 25% to 50% higher, and in tensile strength and durability, it has always met the most exacting requirements.

Made in sheets or rolls from .004 to ⅛ of an inch in thickness.

Super-Seasoned Fibre

Invariably whatever requirement you use as a standard of determining quality—"S-S" Fibre proves itself superior. Whether in dielectric strength, tensional or torsional strength, in rigidity, homogeneity or in adaptability to machining conditions "S-S" Fibre stands first.

Send for our "S-S" Fibre Book.

S-S
TRADE MARK
SUPER-SEASONED FIBRE

NATIONAL FIBRE & INSULATION CO.
Box 417 YORKLYN · DELAWARE

NEW YORK
CHICAGO
PHILADELPHIA

DETROIT
SAN FRANCISCO

CLEVELAND
OMAHA

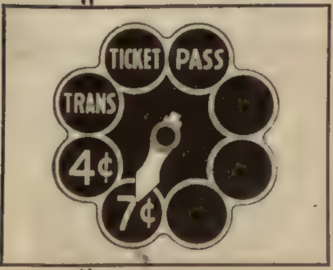
PITTSBURGH
BOSTON

ROCHESTER
BIRMINGHAM

ST. LOUIS
BALTIMORE
LONDON, ENGLAND

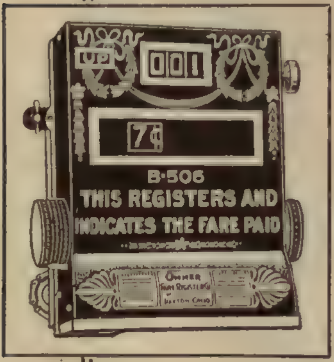
In CANADA: National Fibre Co. of Canada, Ltd., TORONTO

THE OHMER SYSTEM



The Ohmer System of fare accounting is based upon correct business principles. It provides a clear indication and a permanent record of every fare, according to its exact amount or denomination.

Publicity is one of the greatest preventives of wrong doing and the Ohmer System places fare collecting in the lime light. The passenger sees his fare properly registered. The conductor knows that he must make the proper registration, or he is liable to instant detection. Every passenger on the car can check each transaction. The dead beat prefers to walk.

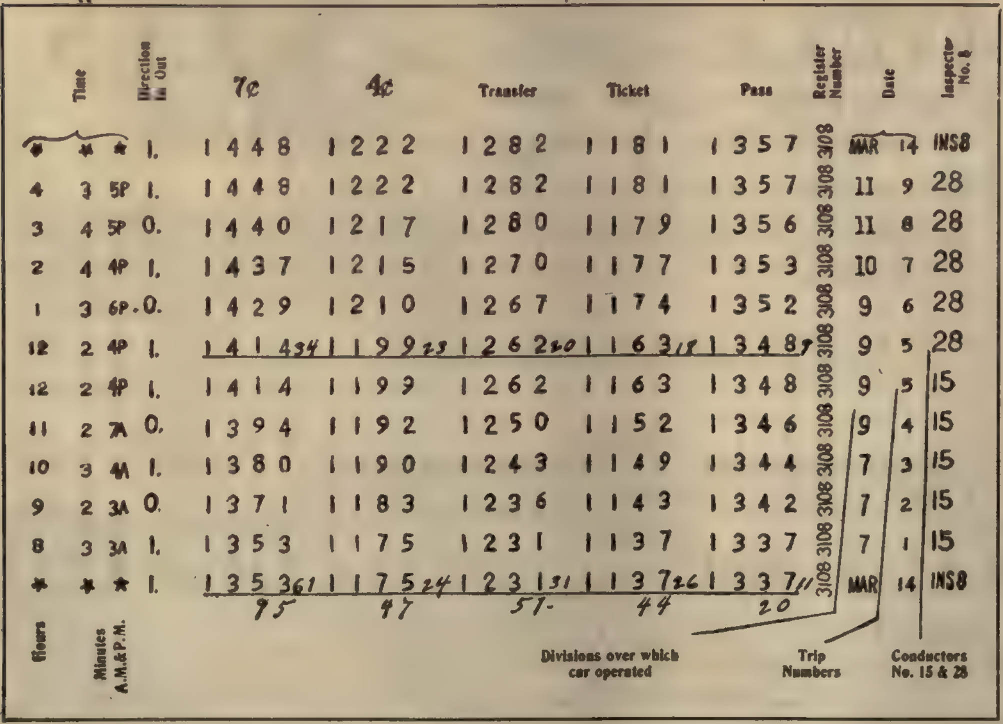


The Ohmer System eliminates lead pencil reports, as well as the collection box method of depending on the honesty of the passenger.

The Ohmer System records are the basis of all statistics of earnings. They are clean cut, untamperable and permanent.

Ohmer Fare Register Company

Dayton, Ohio



Time			Direction In Out	7¢	4¢	Transfer	Ticket	Pass	Register Number	Date		Inspector No. 8
*	*	*	I.	1448	1222	1282	1181	1357	3108	MAR	14	INS8
4	3	5P	I.	1448	1222	1282	1181	1357	3108	11	9	28
3	4	5P	O.	1440	1217	1280	1179	1356	3108	11	8	28
2	4	4P	I.	1437	1215	1270	1177	1353	3108	10	7	28
1	3	6P	O.	1429	1210	1267	1174	1352	3108	9	6	28
12	2	4P	I.	1414 34	1199 23	1262 20	1163 18	1348 9	3108	9	5	28
12	2	4P	I.	1414	1199	1262	1163	1348	3108	9	5	15
11	2	7A	O.	1394	1192	1250	1152	1346	3108	9	4	15
10	3	4A	I.	1380	1190	1243	1149	1344	3108	7	3	15
9	2	3A	O.	1371	1183	1236	1143	1342	3108	7	2	15
8	3	3A	I.	1353	1175	1231	1137	1337	3108	7	1	15
*	*	*	I.	1353 61	1175 24	1231 31	1137 26	1337 11	3108	MAR	14	INS8
				95	47	51-	44	20				
Hours	Minutes A.M.&P.M.											

Divisions over which car operated

Trip Numbers

Conductors No. 15 & 28

Cash Fares From a Crowd Like This?

Every fare your conductor is unable to collect is just that much net revenue lost. How much net revenue do you lose this way when rush hour crowds swarm homeward, when ball games break up and when the movies let out?

You Need
GLOBE TICKETS
to Handle Such Conditions

With Globe Tickets, designed by experts to exactly fit whatever "local conditions" you have, your conductors' work will be lightened, their speed in collecting fares vastly increased and their ability to collect all the fares will be practically certain.

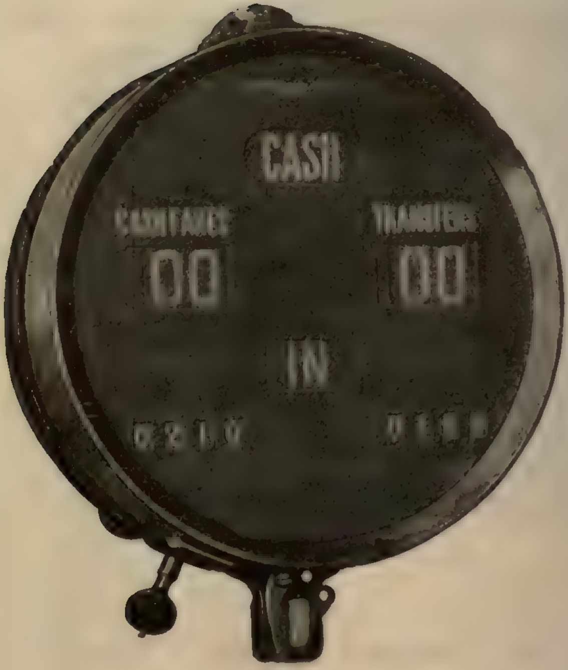
Moreover, the use of tickets sold in strips or books has proved a healthy stimulus to the riding habit. Friction with the public is minimized where Globe Tickets are used in connection wth odd fare units, zone systems, etc. The cost per passenger, for Globe Tickets, is so small as to be entirely negligible. Write for samples and quotations.

Also Globe P.M. Coupon Transfers

A special form of transfer designed by us to save conductors time and to eliminate abuse of transfer privileges. This type of Globe Transfer is filling the bill on one of the busiest lines in America—the Broadway surface cars of New York City.

GLOBE TICKET COMPANY
112-114 North 12th St., Philadelphia, Pa.

Fare Registration must be accurate and complete



It is the only point of contact between the Company, the platform man and the passenger — and the only way that facts concerning revenue and passengers can be determined.

The accurate record provided by

International Fare Registers

gives a firm basis for accurate judgment—dependable figures upon which to base the solution of today's problems.

Cars equipped with money counting fare boxes need this visible and audible registration of the fare register as an additional check against the fare box. Where non-registering fare boxes are used a fare register affords the only method of checking against the fare box. Only by their use can the registration of paper tickets and transfers be made.

International Fare Registers have been serving Electric Railways and City Systems for 25 years. The test of long service has established them as the standard equipment for this use.

The single R-10 and double R-5 models illustrated here are two widely used types from the International line.

They are easily operated by hand or foot, either mechanically, or by an electric or pneumatic device.

The International Register Co.
15 South Throop St., Chicago, Ill.

Manufacturers of Single Registers, round and square; Double Registers, Duplex Counters, Car Fittings. Exclusive selling agents for

HEEREN ENAMEL BADGES

Johnson System

A Winning Combination Which Will Glean Many a

$1,000.

Johnson Fare Boxes

will pick up many a thousand dollars that you never knew existed.

Take, for example, the United Traction Company of St. Louis, or the Los Angeles Railway Corporation, whose large investments in Johnson Registering Fare Boxes have been returned to them several times over since the Boxes were installed.

Johnson Metal Tokens

were an important factor in the Toledo installation, whose $90,000 investment in Registering Fare Boxes and METAL TICKETS was returned to them twice over in three months. The combination of the Boxes and Metal Tokens accounts for an accurate check-up of within a very small fraction of one per cent. Are they worth it? Just ask the companies who are using them.

Johnson Universal Changers

are the handy aid to the conductor in making change. They give him plenty of leisure time, even in rush periods, to closely observe the fare payment of each passenger. No fare dodgers get by him! The Universal Changer also prevents loss from mistakes. Universal Changers are so named because they can be assembled in any combination or numbers of barrels and each barrel is adjustable.

Write for prices

Johnson Fare Box Company
Ravenswood, Chicago, Illinois

Fare Collection

Prove to Your Own Satisfacti

The booklet "Trolley Wheels" contains a fund of vital facts on various types of More-Jones Trolley Wheels and Harps. *Write today for a free copy.*

V-K

Oil-less Trolley Wheels and Harp

The elimination of avoidable waste is the surest and quickest route to increased efficiency.

Unwise purchasing of materials is a direct charge against management and means not only a direct loss of materials and labor but a larger and more vital loss due to enforced idle equipment.

V-K NON-ARCING HARPS used with V-K OIL-LESS TROLLEY WHEELS will materially reduce operating and maintenance costs—they eliminate current loss through arcing—they have a longer life and require less attendant labor (the bushings are oil-less) than any other device on the market.

Every particle of avoidable waste and therefore loss of efficiency is eliminated when you standardize on V-K Non-Arcing Harps and V-K Oil-less Trolley Wheels.

We can prove this to your own satisfaction. We will be glad to show you the savings possible on your road.

More-Jone

e Merits of More-Jones Products

Tiger Bronze

Axle and Armature Bearings

are used by most Electric Railway men because they render a superior service.

Defective material in axle and armature bearings is avoidable waste and means a heavy expenditure for replacements, labor and cars out of service.

The quality of the material used in Tiger Bronze bearings insures great strength and a very slow and even rate of wear—*the result,* correct bearing alignment and far greater mileage.

The cost of Tiger Bronze, measured in terms of service rendered, is lower by far than any other axle and armature bearings on the market.

Let us prove this to your own satisfaction.

Armature Babbitt

There is a difference between ordinary high grade babbitt and M-J Armature Babbitt and that difference represents a considerable item of expense over a period of time.

Ordinary babbitt is not equal to the peculiar conditions of the electric railway armature bearing field such as temperature, strain, vibration and pounding.

A failure means maintenance costs and a car out of service—it's largely an avoidable waste. It isn't the loss in babbitt that counts, it's the loss in service.

We can prove to your satisfaction that M-J Armature Babbitt represents the biggest dollar for dollar babbitt value on the market.

It has been adopted as standard by a majority of electric railways—the reason is obvious, maximum *service* at minimum cost.

MORE-JONES BRASS & METAL CO., ST. LOUIS

M- -J

uality Products

S-W

Brake Slack Adjuster

Build Confidence This Year

More than ever before must the street railways of the country seek to restore and build up a feeling of mutual confidence between themselves, their employees and their patrons.

One big step in this direction is by the use on cars of the best automatic equipment for improving operation and promoting safety.

Smith-Ward Brake Slack Adjusters automatically take up the slack in brake rigging. They keep it constantly taut and ready for instant response to the motorman's will. That's why motormen make better time with fewer accidents on cars equipped with Smith-Ward Adjusters. They have unlimited confidence in the brakes. And confident employees engender confidence in patrons.

Longer life for brake shoes is an important by-product of the use of Smith-Ward Adjusters. The wear is more evenly distributed. The saving from this item alone will go a long way toward paying for the equipment.

SMITH-WARD BRAKE COMPANY

233 Thirty-seventh St., Brooklyn, N. Y.

Standard Helical Gears

Rounded Teeth
form a ready means of identification and eliminate sharp corners.

An Operator Reports

"Helical Gears have run 70,000 miles in 20 months. No excessive wear on gears or pinions and both are nicely polished. The bearings show practically no lateral wear."

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

Nuttall

SAMSON SPOT

Trolley Cord and Samson Signal Cord

Modern transportation with one-man cars and multiple-unit trains demands the greatest care in the selection of even the smallest items. Delays and annoyances must not occur on the road. Samson Cords are strong and durable. They resist abrasion. Their smooth flawless finish insures maximum wear, and freedom from jamming and snarling. Look for Samson Spot Trolley Cord, the Cord with the Colored Spots.

Samson Cordage Works, Boston, Massachusetts

Kalamazoo
Trolley Wheels and Harps

Performance that *Improves Service*

EQUIP your cars with Kalamazoo Wheels and Harps and note the immediate *improvement in service.*

Kalamazoo Harps give perfect and continuous contact and are designed to permit quick and easy replacement of wheels. There is only one cotter pin to be taken out to remove the wheel.

Kalamazoo Wheels are made of virgin metal—pure lake copper. They are perfectly balanced for easy running and freedom from slippage.

Kalamazoo Wheels used with Kalamazoo Harps make the ideal current collector from the standpoint of long life and efficient service.

Write for illustrated catalog.
It will be mailed free upon request.

Star Brass Works
Kalamazoo, Mich.

STOP with

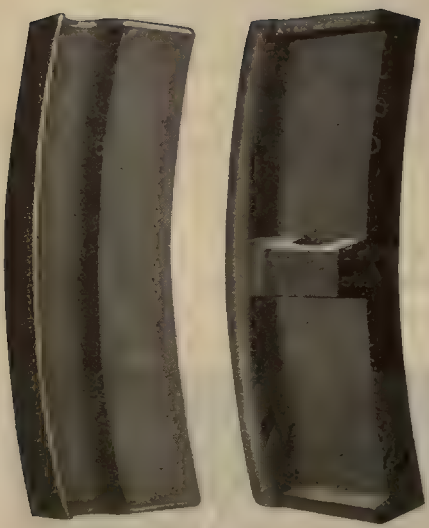
Weierbach Brake Shoes

Study these mileage statistics

WEIERBACH vs *"OTHER" BRAKE SHOES

	Car No.	Brake Rigging	No. of Shoes	Average Milege Weierbach	Average Milege *"Other"
Mail and Baggage	167	Inside	8	11,947	11,036
Coach	209	Outside	8	23,947	9,821
Coach	275	Clasp	16	37,126	25,110
Parlor Car—Six Wheel Truck	...	......	12	29,084	14,782
General Average Mileage per Shoe				25,308	15,187

*Name on request



Engineers and motormen report that they can do better braking with at least one-third less air, and stop train in considerable less distance with WEIERBACH SHOES than with other shoes.

On any type of car, from Birney to Pullman, Weierbach Brake Shoes will so far outlast ordinary metal shoes, that there is no comparison necessary as regards economy. They transmit maximum braking efficiency for the quickest stop without screeching, chattering or jerking. Made in M. C. B. and A. E. R. A. standard designs.

Order some and make your own tests

Weierbach Brake Shoe Co., Scranton, Pa.

WESTERN SALES AGENT
A. H. Hoffman, 315 American Bank Bldg., Los Angeles, Calif.

TRADE MARK

AJAX

Bearing Metals and Castings

Mileage Increased—Costs Reduced

In over forty years' experience, our production of bearings and bearing metals has grown from a small beginning to a present rate of thousands of tons per year.

In the hard struggle of the electric railways to exist, no product could survive unless its quality resulted in maximum economy. That's why Ajax Bearings are so generally used. And our immense quantity production means standardized methods and lowest prices consistent with superior quality. Consequently, you can surely count on *lower costs per car mile* for cars running on Ajax Bearings.

Ajax Check Plates

Ajax Car Brasses

The Products Are

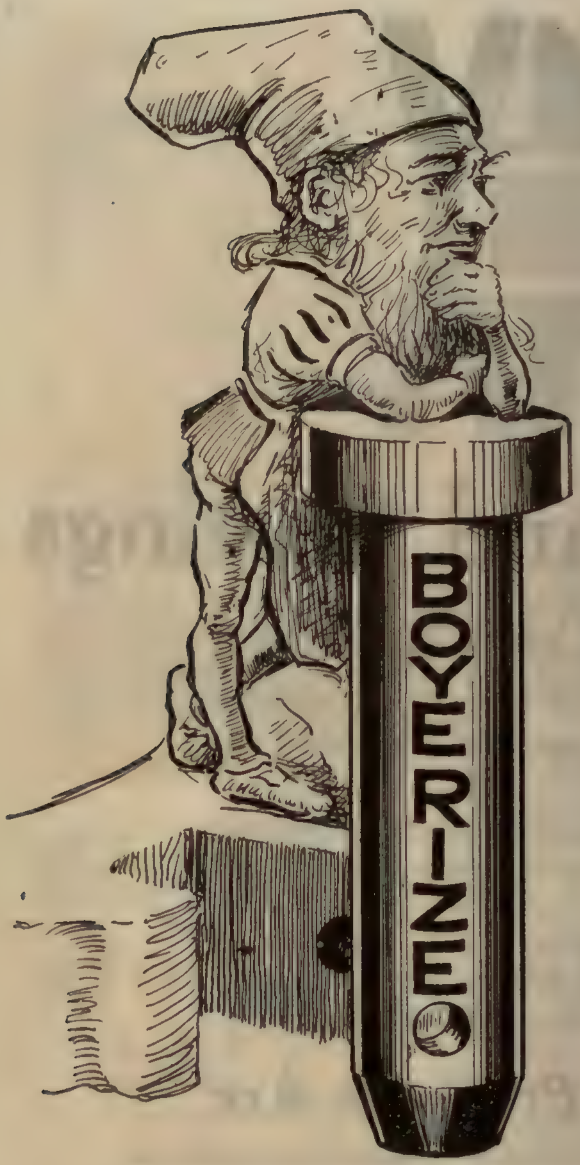
AJAX CAR BRASSES—leaders in their field for more than forty years. They are cast of finest quality metals, and turned with the accuracy and precision of a car wheel.

AJAX CHECK PLATES—made of our Perfecto Bronze, which will bend before it will break. They outlast other check plates and give entire satisfaction.

AJAX BULL BEARING ALLOY—the most dependable and economical lining for brasses and axle bearings—it lasts longer, runs cooler and costs less.

Specify Ajax products for new equipment and repairs

THE AJAX METAL COMPANY
Established 1880
Philadelphia, Pa.



Worrying?

What About?

Likely enough of how you can cut down expenses.

You've gone up and down the accounts pencil and paper in hand, but still that Injuries and Damages account stands out like a fistful of sore thumbs.

Why not get behind the returns of the "I & D"?

Dig out how many dollars were *lost* due to rear-end collisions, run-downs and runaways. Didn't some of those accidents follow because the brake rigging didn't back up the brake valve?

Your maintenance staff will say so!

BOYERIZE

Those maintenance men will be glad to have you approve their remedy, knowing that for every extra dollar spent to *Boyerize* brakes and trucks, a hundred dollars may be saved in the injuries, damages and bad will account. Boyerized anti-accident Pins and Bushings are not the only parts of the brake and truck equipment that your men want. These and other Boyerized long-life specialties belong with them, also, from the important standpoint of getting *more money miles from the cars that lie least over the pits.*

Here They Are!

Stag Brand Manganese Steel Brake-Shoe Heads
Boyerized Brake Hangers
Boyerized Wearing Plates between the Bolster and Bolster Carrier.
Boyerized Wearing Plates between the Pedestal Straps and the Journal Box
Boyerized Pins and Bushings for Door Fixtures

BEMIS CAR TRUCK COMPANY
Springfield, Mass.

York Railways Co., Pa.

MILLER
Trolley Shoes

are on the new cars of the York Railways Company, designed for the high-speed 18 mile line between York and Hanover, Pa.

Why?

Because the three-inch smooth sliding contact means far greater current collecting capacity at high speeds—it means elimination of arcing—it does away with cases of jumping trolleys which tear down the overhead. It runs just as well when these cars operate over city lines as at 45 miles an hour in the open—and finally, it shows lower maintenance costs on both wire and shoe, than when wheels are used.

Give Miller Trolley Shoes a trial on your cars.

Miller Trolley Shoe Company
Dorchester, Mass.
Alfred Connor, Denver F. F. Bodler, San Francisco
T. C. White & Co., St. Louis S. M. McClintock, St. Paul
S. I. Waily, Los Angeles
W. F. McKenney, Portland, Ore.

NEXT DECEMBER
When You Balance the Books Again!

What do you hope to show—a more favorable balance than 1921 has shown?

What are your plans for doing it? Increased fares? Not much chance of that with prices now generally on the downward trend.

More passengers at present or even at reduced fares, and at a lower cost of operation — that's the answer which forward-looking managements are giving to this question today.

Safety Cars for Better Results

Standard Safety Cars have been in use long enough now, and in the widest variety of service from largest cities to smallest hamlets, so that there in no longer any question of the experimental stage about them. They have proved that more frequent and faster service attracts more passengers, They have proved that they can be operated at a much lower cost per mile than the old style cars. They have proved to be better than any attempts at legislative restriction against the sporadic attacks of jitneys.

No Investment Necessary

Don't let the investment problem tie your hands! We are prepared to sell safety cars for cash, of course, or on the car trust certificate plan. BUT—our new leasing plan provides the means for any road, no matter how hard-pressed financially, to equip itself with safety cars without even the burden of the usual initial payment. Regular payments out of earnings from the cars, meet the rentals and apply toward the ultimate purchase.

That's how sure we are, that safety cars will make money for your road.

National Safety Car & Equipment Co.

OUR ORGANIZATION

Geo. H. Tontrup, President
C. W. Rhoades

E. T. Bronenkamp, Vice-President
Thos. Simons

EASTERN REPRESENTATIVES:
National Railway Appliance Co.
(Hegeman & Castle)
50 East 42nd Street, New York.

SOUTHEASTERN REPRESENTATIVE:
Atlanta, Ga.
E. A. Thornwell.

We represent

Cincinnati Car Company	**Safety Cars**
Hale & Kilburn Corporation	**Car Seats**
Keyes Products Company	**Nevasplit Headlinings**

GRIFFIN
F. C. S. Wheels

From the standpoint of both *Economy* and *Safety* the CHILLED IRON WHEEL is the ideal wheel for *all classes of service.*

LOW COST
MAXIMUM
MILEAGE

Facilities at each foundry for
mounting wheels on axles

Griffin Wheel Company
McCormick Building, Chicago, Ill.

FOUNDRIES:
Chicago Detroit Boston Los Angeles Denver
St. Paul Tacoma Kansas City
Council Bluffs

OHIO
ELECTRIC RAILWAY COMPANIES
UNANIMOUS
IN THEIR APPROVAL OF
"TOOL STEEL" GEARS AND PINIONS

Here are detailed figures to show how we stand with our "near neighbors," those who have known us longest, tried us most thoroughly, and lines representing all types of service, city, surburban, light, heavy and third rail interurban.

Regular Users

(Roads buying "Tool Steel" practically exclusively and having so bought for years—in many cases completely equipped with "Tool Steel.")

3 large city lines with total of	3053 cars
5 smaller city lines with total of	226 cars
3 combined city and interurban lines, total of	747 cars
17 interurban	308 cars
Total 28 companies	4334 cars

Repeat Orders, Satisfied Customers

(buying for severe service motors, but not exclusively)

2 city lines with total of	359 cars
2 combined city and interurban	199 cars
5 interurbans	201 cars
Total 9 companies	759 cars

Satisfied Users

(Companies that have tested "Tool Steel" and acknowledged it is the best. In some cases, however, buying but little because of first cost or financial reasons.)

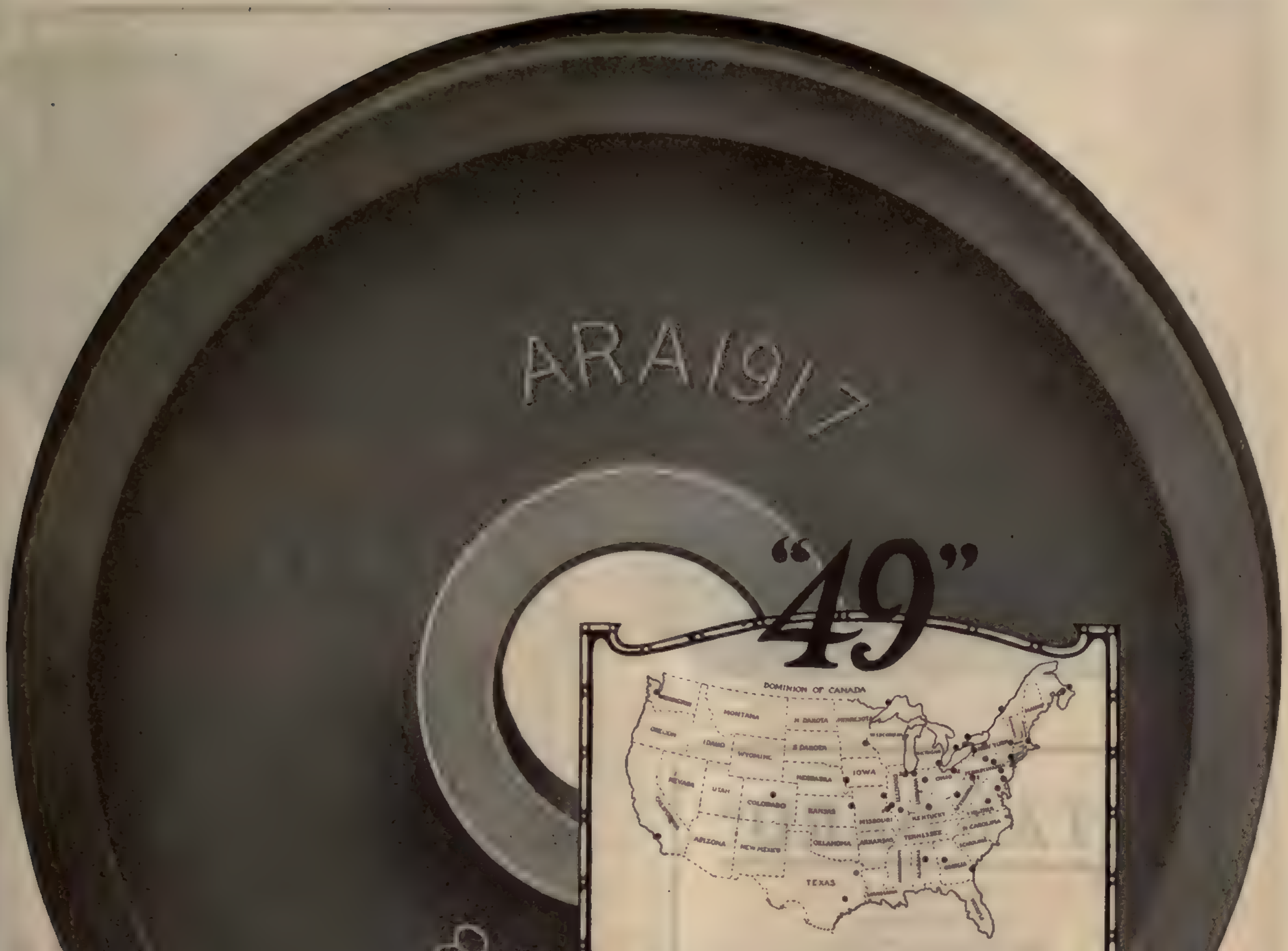
7 city lines	344 cars
2 city lines and interurban	166 cars
6 interurbans	74 cars
Total 15 companies	584 cars

And the non-users. who have never tried "Tool Steel," total 6 companies with a total of 23 cars and no company has over 7 cars! !

Blind purchasing? To our positive knowledge, five of the largest companies have run definite tests to prove the relative merits of "Tool Steel" with the most modern competitive grades.

NOTE—Before printing this advertisement, proof copy was sent to each road in the State with return stamped envelope, asking them to signify if they did not approve it: A single "black ball" would have rejected the copy. There was not one.

The Tool Steel Gear and Pinion Co.
Cincinnati, Ohio



THE map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels.

Chicago, 3
St. Louis, 2
Buffalo, 4
Pittsburgh, 2
Cleveland, 2
Amherst, N.S.
Montreal
Mich.City,Ind.
Louisville
Mt.Vernon,Ill.
Ft.Wayne,Ind.
Birmingham
Atlanta
Savannah
Boston
Detroit
St.Paul
KansasCity,Kan.
Denver
Tacoma
Rochester,N.Y.
Sayre,Pa.
Berwick,Pa.
Albany
Toronto
NewGlasgow,N.S.
Madison,Ill.
Huntington,W.Va.
Wilmington,Del.
Houston,Tex.
Hannibal,Mo.
Reading,Pa.
Baltimore
Richmond,Va.
Ft.William,Ont.
St.Thomas
Hamilton
Ramapo,N.Y.
Marshall,Tex.
Los Angeles
Council Bluffs

American Railroad Association Standards

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
850 lb. wheel for 140,000 Capacity Cars

The Standard Wheel for Seventy-One Years.

CHILLED IRON WHEELS

for railway and street car service. Capacity 20,000 per day. 25,000,000 in service.

ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
1847 McCormick Bldg., Chicago

CHILLED IRON WHEELS

In Chicago and Outside!

On the long, fast elevated passenger trains, and the heavy electric switching locomotives of the Northwestern Elevated Railroad of Chicago, they use reliable, long-wearing "Standard" Rolled Steel Wheels. And then too, on that high-speed interurban line,—the Chicago & Milwaukee Electric Railway—now famous for superlative service, speed and safety they also use them.

S BRAND "The 'Standard' Brand on your material is an assurance of eventual economy." S BRAND

"STANDARD"

Steel Tires
Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Gear Blanks
Steel Forgings **Iron Forgings**
Forged and Rolled Steel
Pipe Flanges
Ring Dies
Rings
Roll Shells **Steel Springs**

Standard Steel Works Company
500 North Broad St., Philadelphia, Pa.

CHICAGO
ST. LOUIS
HAVANA, CUBA
ST. PAUL
RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON
PORTLAND, ORE.
MEXICO, CITY
BOSTON, MASS.
PITTSBURGH, PA.

MIDVALE
AND
CAMBRIA
PRODUCTS

THE MIDVALE Steel and Ordnance and Cambria Steel Companies manufacture a very wide range of steels and steel products in which are included specialties to meet the needs of almost every industry.

Our "List of Steel and Other Products" itemizes these in detail and will be mailed on request.

Among the various products listed are:

Alloy and Tool Steels
Agricultural Steels
Axles
Bar Steel of Every Description
Boiler Plates, Manholes and Hand Holes
Charcoal Iron Boiler Tubes
Forgings of All Kinds
Heavy Forgings a Specialty
Forged and Rolled Discs and Annular Sections Weighing 100 Pounds or More
Locomotive and Car Wheel Tires
Plow Steel
Rolled Steel Wheels
Steel Cars
Steel Rails
Structural Shapes
Tool Steels
Tractor Steels and Specialties
Wire Rods, Wire and Wire Products

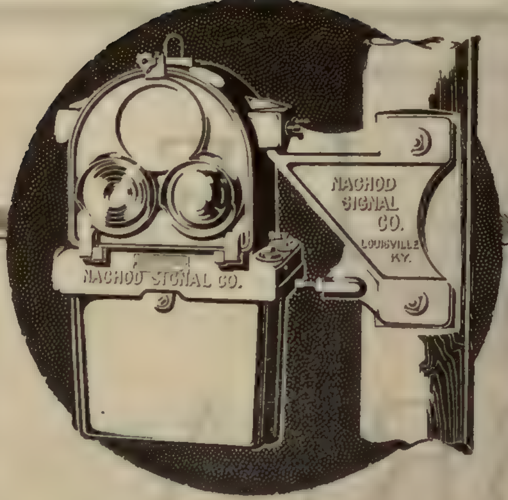
MIDVALE STEEL AND ORDNANCE COMPANY
CAMBRIA STEEL COMPANY

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Detroit
New York

General Offices:
Widener Building Philadelphia, Pa.

Philadelphia
Pittsburgh
San Francisco
Salt Lake City
Seattle
St. Louis
Washington, D.C.

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 25 BROADWAY, NEW YORK, U.S.A.



Keep Your Cars Moving

The manager speaks: "The main thing about operating street cars, and especially on single track lines, is to keep the cars moving and not have them waste a lot of time on switches waiting for meets. This, more than anything else, exasperates and drives away passengers."

Verily, the car on the switch gathers no dividends.

Nachod Signals are invaluable with

Safety Cars

to maintain the short headways that invite the public to ride. Nachod Signals tell the motorman when the block is clear to the next passing siding. Show him when he takes the block that he has stopped an opposing movement. Permit other cars to follow him thru the block, notifying them that the block is occupied and giving each an indication of protection in entering; meanwhile holding stop signals at the other end until the block is again clear.

NACHOD SIGNALS

protect all shifting moves automatically, permitting city and interurban cars to change order at a siding.

They save time by eliminating a stop, since they work at any speed. They operate from overhead contactors at any feasible line voltage and give duplicate indications of lights and disks that cannot be mistaken under any lighting conditions.

Catalog 719 describes Nachod Signals. Write for it.

Nachod Signal Co., Inc., Louisville, Ky.
Manufacturers of Automatic Signals, Highway Crossing Bells and Automatic Headway Recorders.

NACHOD SPELLS SAFETY

CARNEGIE

Wrought Steel

WHEELS

Axles

Rails and Cross Ties

for steam, electric and industrial service

Shapes

Plates-Bars

Complete Steel Service

Carnegie Steel Company
General Offices: Carnegie Building, Pittsburgh, Pa.

1488

HOLLOWSPUN Concrete Trolley Poles Installed by the Northeast Oklahoma Railroad Company in Miami, Oklahoma.

Massey Concrete Products Corporation
Peoples Gas Bldg., Chicago

New York
50 Church St.
Dallas
Sumpter Bldg.

Pittsburgh
Oliver Bldg.
St. Louis
Ry. Exch. Bldg.

Atlanta
Candler Bldg.
Salt Lake City
925 S. 6th St., W.

Round Top Straight Line Suspension

Adjustable Insulated Crossover

Look-Over Overhead!

and see how much is needed to put your trolley lines in good condition again. It doesn't pay to delay maintenance too long. Use—

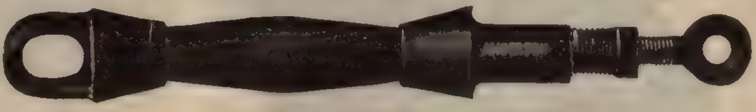
ANDERSON

Aetna Insulation

Line Material

for economical rehabilitation. While it's not necessarily the cheapest to purchase, it's the cheapest to use, because of its reliable long life.

Write for bulletins and quotations.



Double Take-Up Wood Strain Insulator

RADE MARK

Reg. U. S. Pat. Off.

Albert & J. M. Anderson Mfg. Co.

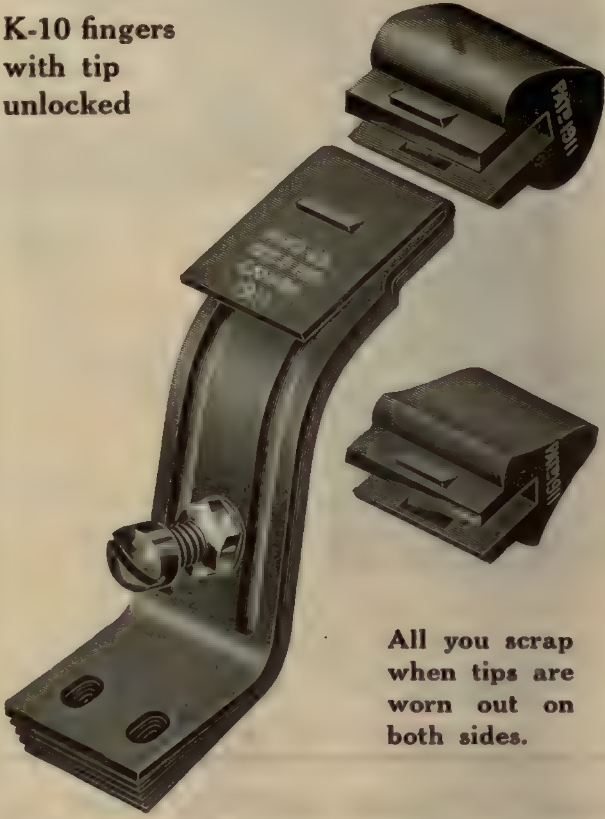
Established 1877

289-293 A St., Boston, Mass.

Branches—New York, 135 Broadway. Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, E. C. 4. 38-39 Upper Thames St.

TRADE MARK
E A A
AETNA
REGISTERED

K-10 fingers with tip unlocked



All you scrap when tips are worn out on both sides.

Never Make a Big Repair When a Little One Will Do

You would think it the height of folly to scrap a controller because a finger had worn out, wouldn't you?

Then why scrap a controller finger simply because the tip has worn out? The principle is the same. Triggerlock fingers are designed to eliminate just that waste of material, money and shop time necessary for the installation of new fingers.

While prices are reduced the fingers are better than ever, as we have been able to obtain a special brand of phosphor bronze with the strength of steel, which will stand years of wear, and with a stock of interchangeable renewal tips they become almost a permanent part of the controller.

There is a triggerlock finger for every type of controller, Yours is among them.

START THE NEW YEAR RIGHT

Write for catalogue
or put in a requisition now.

Russell Manufacturing Co.

814 Bath Ave.,
Niagara Falls, N. Y.

11 Pinewood Ave.,
Toronto, Canada

If this car should leave the rail

All lines blocked, revenue income stopped as long as cars are held up. Crowds gathering, passengers muttering, everyone impatiently awaiting the wrecking crew unless your cars are equipped with

READING REPLACERS

With the Reading Car Replacer the car crew will run the wheel back on the rail in a jiffy. Calks are provided to prevent sliding on any kind of pavement, and the wheel drops right the first time. The car is on its way and the threatened "jam" is avoided.

Reading Replacers are made in two weights, "R.D." and "Heavy R.D." Every car should carry a pair.

AMERICAN CHAIN CO., Inc.
(Reading Specialties Division)
Bridgeport, Connecticut

District Sales Offices:

Boston
Chicago
New York
Philadelphia

Pittsburgh
Portland, Ore.
San Francisco

ALLIS-CHALMERS

AA-7B
Air Compressor

Street Car Mounting

A single acting duplex compressor with crank case and cylinders integral. One-piece cylinder-head for both cylinders contains suction and discharge valves. Trunk pistons operated by connecting rods with bushings provided for taking up wear.

Heavily designed crank shaft of high grade steel turns in journal bearings of ample proportions to insure minimum wear.

Herringbone Gears transmit power from motor shaft to crank shaft with practically silent operation.

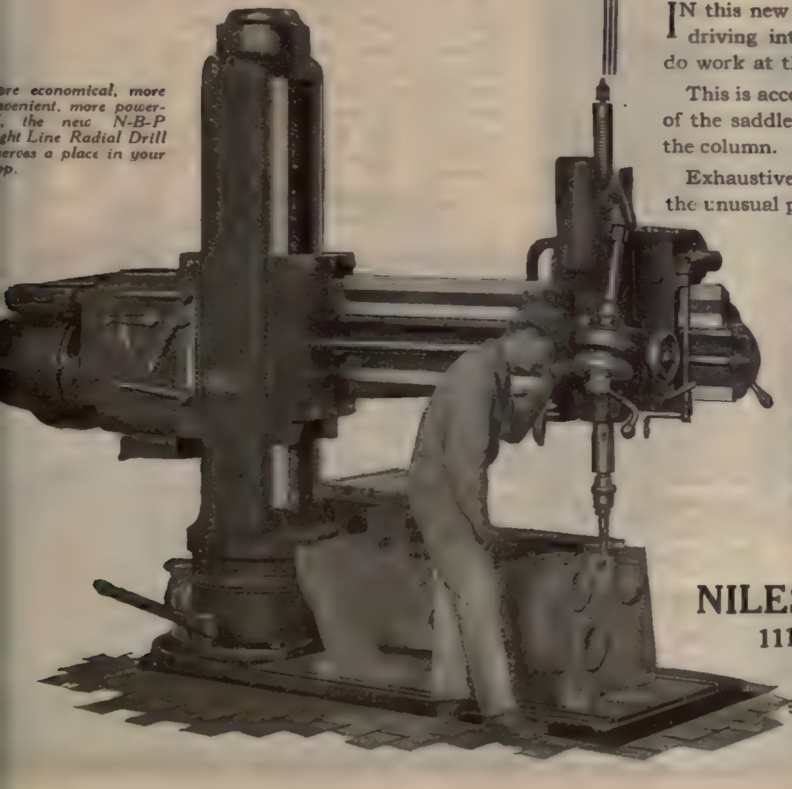
Lubrication is positive and efficient. Connecting rods dip into the oil and splash reaches all working parts. Gears run in oil.

Send for Bulletin.

ALLIS-CHALMERS MANUFACTURING CO.
MILWAUKEE, WIS. U.S.A.

Only Five Gears between Motor and Spindle

ore economical, more venient, more power-, the new N-B-P ght Line Radial Drill erves a place in your p.



IN this new design radial drill power ordinarily lost in driving intermediate gears and shafting is conserved to do work at the tool.

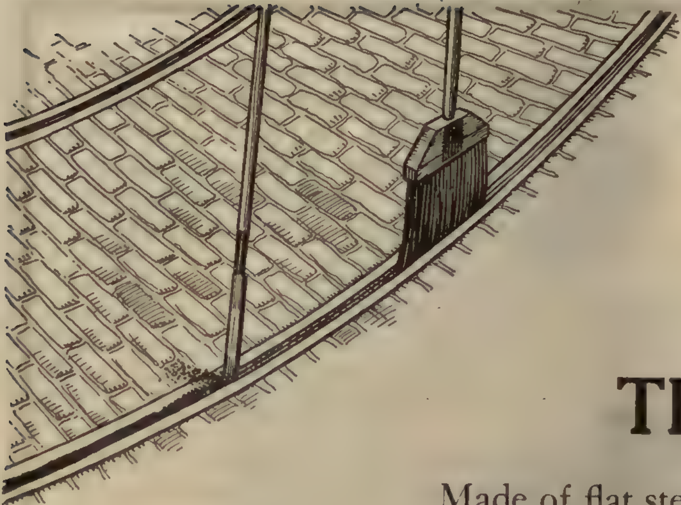
This is accomplished by mounting the motor on the end of the saddle-arm and driving the spindle direct through the column.

Exhaustive tests in various plants have demonstrated the unusual power of this new drill. It exceeds in strength and rigidity any other radial of equal range.

Extremely simple, centralized control is another feature which speeds up work and increases capacity. Every operation is controlled from the drill head. A convenient lever starts, stops and reverses or varies the speed of the spindle—another lever traverses spindle and engages power feed. Fine hand feed, traverse of head, feed change dial, automatic trip and electric column clamp are all within arm's reach.

Ask for the catalogue

NILES-BEMENT-POND CO.
111 Broadway, New York City



Snow and Ice

cannot resist the action of

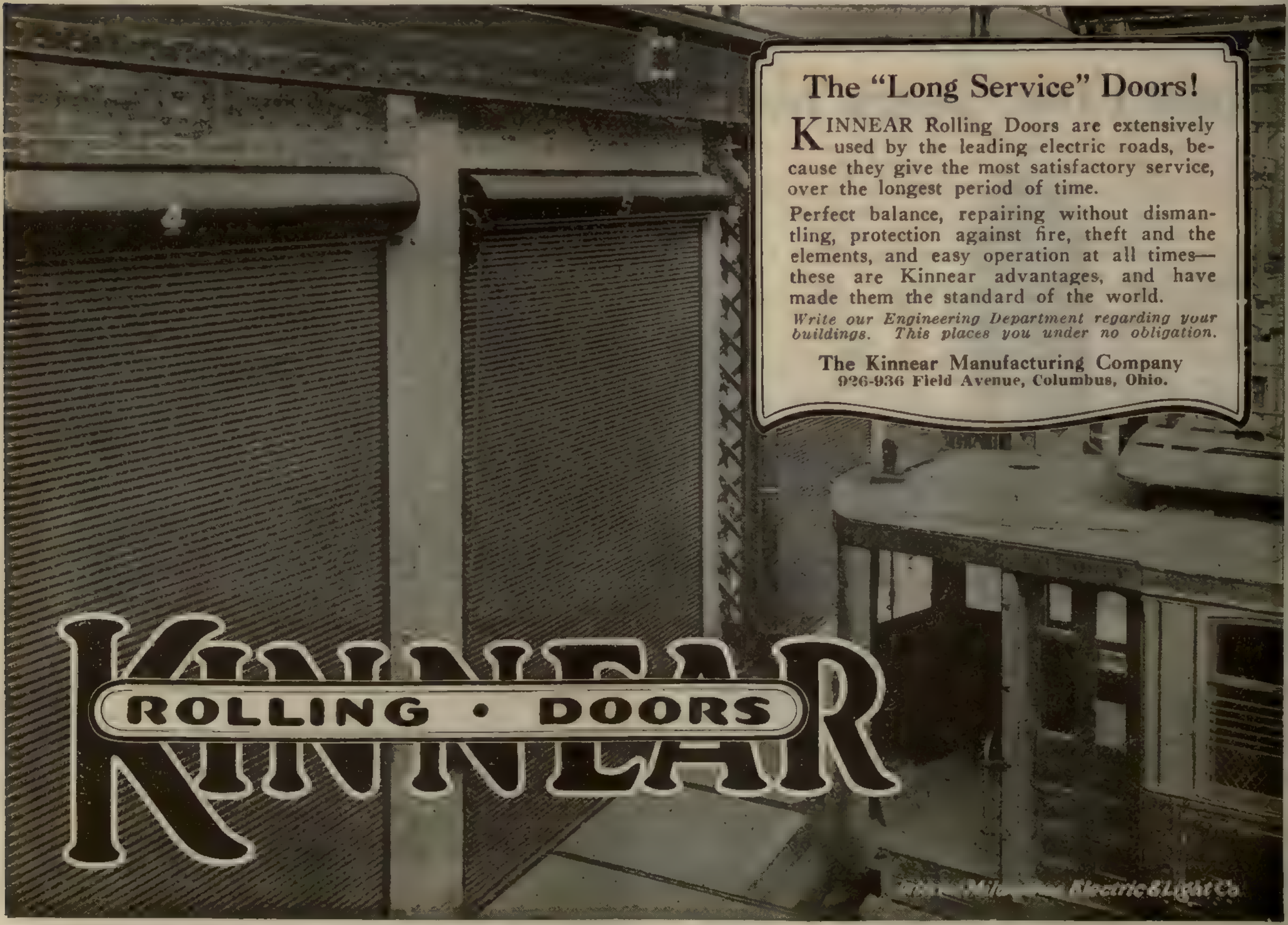
PAXSON'S TRACK BROOMS

Made of flat steel spring wire—Fits frogs, switches and grooves—Has strong ash handle with steel chisel on other end—Broom is light in weight but strong in construction—A constant seller for 25 years.

Send for a Sample—You will be pleased.

FOUNDRY FACINGS SUPPLIES & EQUIPMENT
J. W. PAXSON CO.
MOLDING SAND
PHILADELPHIA, PA.

J. W. PAXSON CO., *Manufacturers*
1021 No. Delaware Avenue, Philadelphia, Pa.



The "Long Service" Doors!

KINNEAR Rolling Doors are extensively used by the leading electric roads, because they give the most satisfactory service, over the longest period of time.

Perfect balance, repairing without dismantling, protection against fire, theft and the elements, and easy operation at all times—these are Kinnear advantages, and have made them the standard of the world.

Write our Engineering Department regarding your buildings. This places you under no obligation.

The Kinnear Manufacturing Company
926-936 Field Avenue, Columbus, Ohio.

HASKELITE ROOF

St. Louis Trackless-Trollicar. Haskelite Roof. Built by St. Louis Car Co., St. Louis, Mo.

Haskelite plywood flew high on the Kirkham triplane, which held the altitude record.

Haskelite is still on top, giving good service as roofs of cars and buses.

Its airplane qualities of light weight and dependable strength make it a favorite material with progressive designers and builders.

We shall be pleased to send you details of the Haskelite roof construction.

Haskelite Manufacturing Corporation
133 W. Washington St., Chicago, Ill.

You Can Bend Rails Quickly and Economically With a Watson-Stillman Hydraulic Rail Bender

Hydraulic Portable Rail Bender

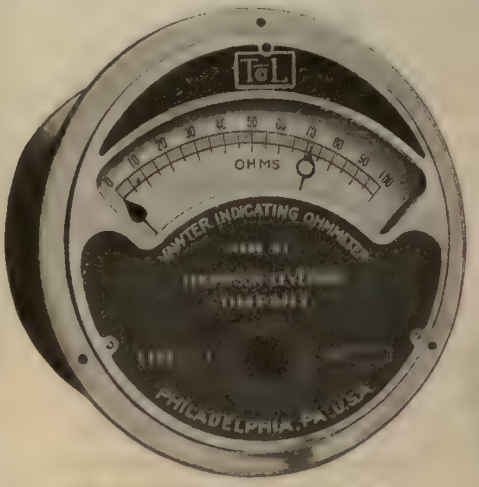
The portable rail bender shown herewith is designed for use on the road. It is equipped with interchangeable formed bending blocks, and will make any bend without buckling. The hinged yoke permits the rails to be put in sidewise. It can also be used for other heavy bending.

We build many other handy tools for the railway shop. Such as: Crank Pin Presses, Wheel Presses, Forcing Presses, Forging Presses, Jacks, Pit Jacks, Punches, Shears, Pumps, Accumulators, etc.

Write for Catalogs.

The Watson-Stillman Co., 46 Church St., New York
Chicago: McCormick Building • Philadelphia: Widener Building

Vawter Indicating Ohmmeters



Vawter Indicating Ohmmeter
Alarm Type
Graduated in Ohms or Temperature

A switchboard alarm type for indicating and giving alarm at any desired temperature of field coils in operation or of superheated steam to turbines or any desired temperature in plant.

Field Coil Testers

A portable type indicating resistance of field coils or armatures directly. Operated on one dry cell and automatically correcting for temperature.

Write Us Your Requirements

Thompson-Levering Company

57th Street and Westminster Ave.
Philadelphia, Penna., U. S. A.

Central Agent:
The J. W. Murphy Co.,
108 S. La Salle St., Chicago, Ill.

Pacific Coast Agent:
King Knight Company
Underwood Bldg., San Francisco, Cal.

Suppose you had a man on every car doing THIS

during every instant the car was in service.

Suppose each man's duty was to save heating current now going to waste.

Suppose each had to constantly watch the thermometer.

Whenever the temperature rose above the arbitrary "point," he must cut off the heating current.

On some roads this would occur many hundreds, yes, thousands of times in the course of a 24-hour day.

You realize, of course, that such a manual task would be well-nigh impossible, but do you realize that this is precisely what the Utility Thermometer Control is doing for more than 100 street railways, including some of the largest and most important in the country!

And it is a method that is free from the "man factor"—a method that, once installed, works AUTOMATICALLY, hour after hour, day and night, week in and week out, year after year, without ever shirking, without complaint, without pay and WITHOUT FAILING to fulfill its function — the saving of your current.

Grasp the enormity of this thing!

Think of buying at a normal sum a "sleepless brain and tireless hand" to stand guard over and automatically regulate the heating current consumed in your cars.

Saves Up to 50% of Heating Current

Here's what it means to you: The desired temperature in your cars automatically maintained at all times with a minimum consumption of current.

Utilization of the heat radiated from the passenger's bodies in a well-filled car, with a corresponding saving of heating current.

A greatly reduced heating load at the very time when the power load is greatest.

And a saving of up to 50 percent of the heating current which would ordinarily be consumed without the use of this device.

Now is the time of all times to save electrical energy. Remember, current saved is coal saved and coal saved is co-operating with the GOVERNMENT in fuel conservation.

Write for further details **TODAY**.

Railway Utility Co., 143 W. 22nd St., Chicago

NEW YORK OFFICE
1328 Broadway

"U"

The Whole Trolley!

Consider the advantage of having one standard material for the whole trolley pole from car roof to wire, especially if you use throughout, high-grade, reliable—

BAYONET

Equipment

Trolley Wheels
Trolley Harps
Detachable Pole Clamps
Trolley Bases
Sleet Cutters

For Fast Work

All parts fit and co-ordinate with greatest possible facility. Bayonet Trolley Harps are made with a quick-detachable feature which permits a change of harp and wheel in 10 seconds. In 30 seconds, with the detachable pole clamp, you can change an entire trolley. Standardize on Bayonet equipment for maximum economy and efficiency.

Send for sample equipment for trial

Bayonet Trolley Harp Co.
Springfield, Ohio

Consider 1922 Requirements NOW!

Prompt deliveries can now be made of all our regular lines of manufacture, including Ramapo Switches, Frogs, Crossings, Ramapo Automatic Return Switch Stands, Ramapo Automatic Safety Switch Stands, etc. Manganese Crossings over Steam and Electric Railways are our specialty. Our engineers will gladly furnish information and plans pertaining to tee rail special work for interurban lines and private right-of-ways.

The features of the Ramapo Automatic Return Switch Stand deserve particular attention. For hand operation it is the same as the Ramapo Automatic Safety Switch Stand: but the automatic action allows the points to be forced open when trailed and return to their original position after each pair of wheels.

These stands are in successful operation on many Interurban lines throughout the country.

RAMAPO IRON WORKS
HILLBURN · NEW YORK

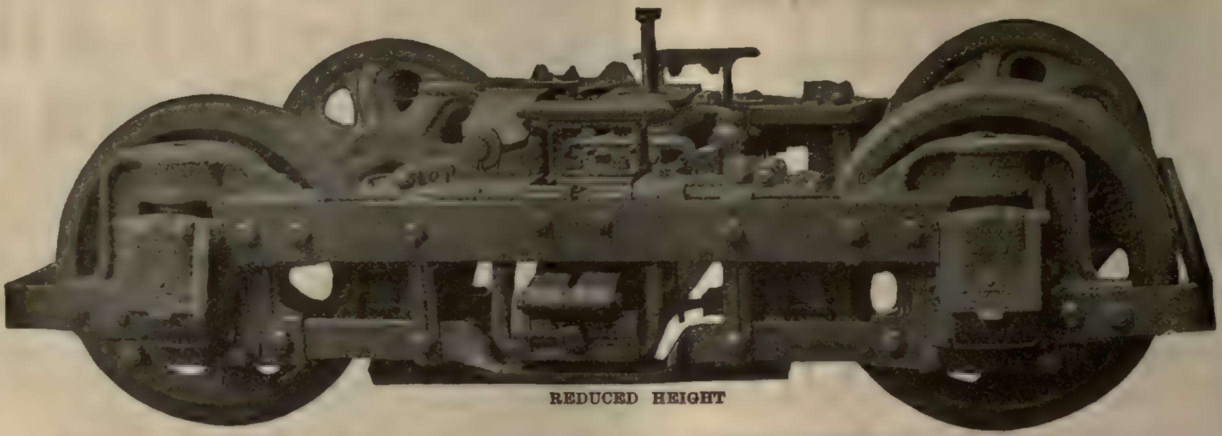
New York Office
50 Church Street
New York

Plants
Hillburn, N.Y.
Niagara Falls, N.Y.

Ramapo Automatic Return Switch Stands are made in three styles for main line and yard installation. Style No. 37 for main line use is illustrated.

Sectional view below cover plate showing mechanism half-thrown automatically.

R. H.
TAYLOR REDUCED HEIGHT TRUCK



REDUCED HEIGHT

TAYLOR R. H. TRUCK

Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car Bodies weighing 16,000 to 22,000 lb. Motors Inside Hung.

EASY RIDING

Journals 3¾ x 7 M. C. B. Type. Height from Rail to Body Bolster, 22¾ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

SPECIFICATIONS ON REQUEST Established 1892 SEND FOR PORTFOLIO

---

for your unattended station lights

Infallible year-round control without attention. Will turn lights on at dusk, off after last train, on again before first train in morning and finally off at dawn.

Sauter Self-Winding Time Switch

Automatic—Motor wound—Automatic adjustment year-round to changing length of day. Applicable also to signal circuit control, automatic and semi-automatic sub-stations.

Utmost accuracy assured through high-grade Swiss-made chronometer escapement, with split balance to compensate for temperature changes. Made in hand-wound types also.

Over 45,000 Sauter time switches now installed

Full description and interesting information can be secured by writing for our catalogue

R. W. CRAMER & COMPANY
136 LIBERTY STREET NEW YORK

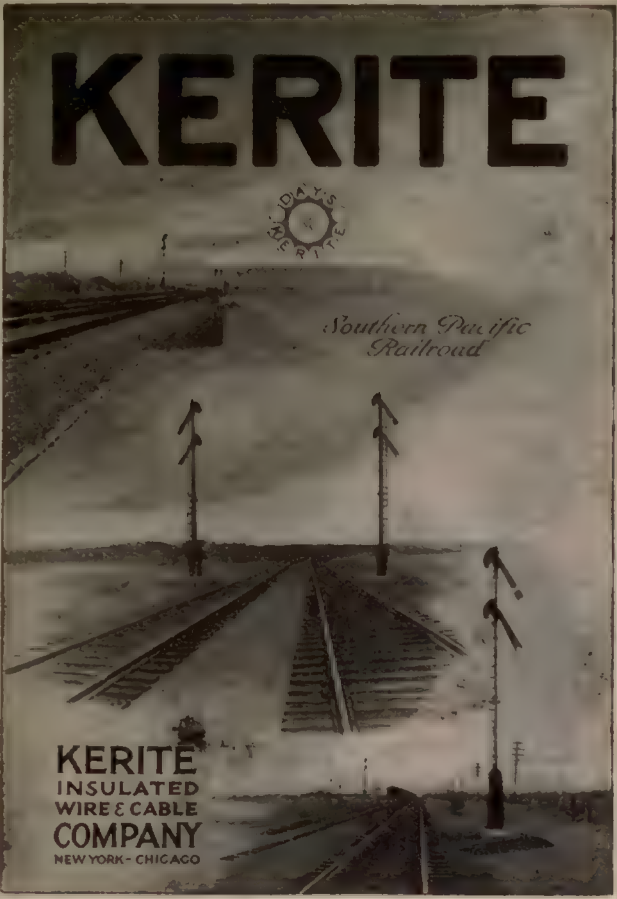
Don't Overlook Opportunities

Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

SEARCHLIGHT SECTION

For Every Business Want
"Think SEARCHLIGHT *First"*

0186


KERITE
DAY'S KERITE
Southern Pacific Railroad
KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK - CHICAGO

American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDERED
TRIPLEX

Arc Weld and Flame Weld

Send for new Rail Bond book

American Steel & Wire Company
CHICAGO
NEW YORK

AMERICAN ELECTRICAL WORKS
AMELECTRIC
Wires and Cables
PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

Galvanized Iron and Steel Wire and Strand
Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

No. 2

AIMCo
REG U S PAT OFF
Electric Railway Automatic Signals

for Accessibility and Reliability

EST. 1865 AIMCo INC. 1915
"American" Insulating Machinery Company
REG. U.S. PAT. OFF.
Philadelphia, New York, Paris, England

Sales Agents:
Electric Service Supplies Co.
Philadelphia, New York Chicago

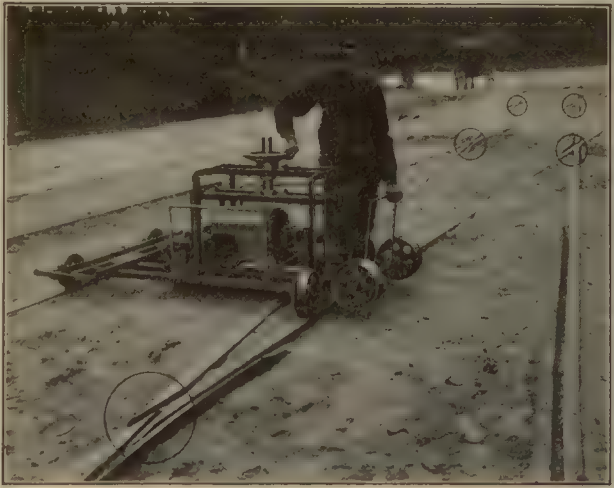
ANACONDA
Copper Wire
111 W. Washington St., Chicago

Electrical Wires and Cables

JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

COPPER CLAD STEEL COMPANY
COPPERWELD
OFFICE AND WORKS.
RANKIN, PA. BRADDOCK P. O.
WESTERN SALES REPRESENTATIVES:
STEEL SALES CORPORATION, CHICAGO, ILL.
NEW YORK SALES OFFICE: 30 CHURCH STREET, NEW YORK CITY
COPPERWELD Wire—*made by the Molten Welding Process*
Bare—Weatherproof—Strand—Twisted Pair—Nails

Chapman Automatic Signals
Charles N. Wood Co., Boston



The Seymour "MIDGET"

Portable Rail Grinder

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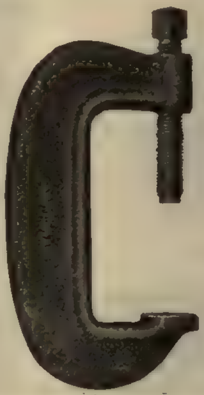

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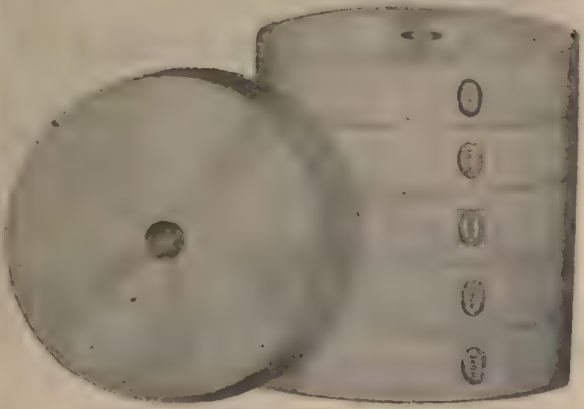

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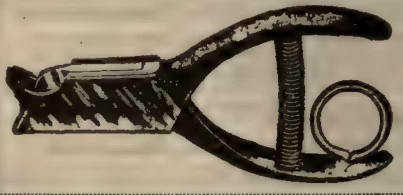

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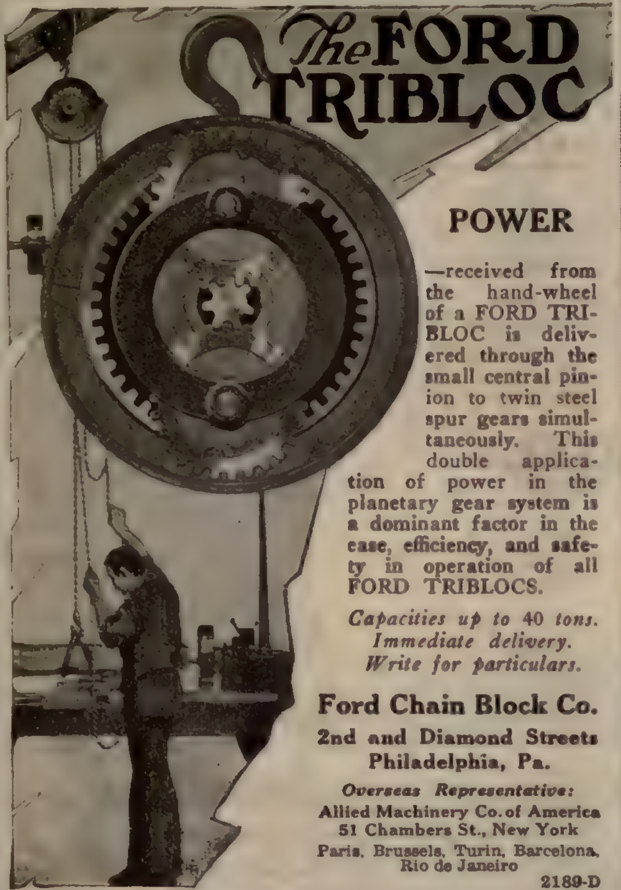

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AS-379, Electric Railway Journal
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P-377, Electric Railway Journal.
1570 Old Colony Bldg., Chicago.

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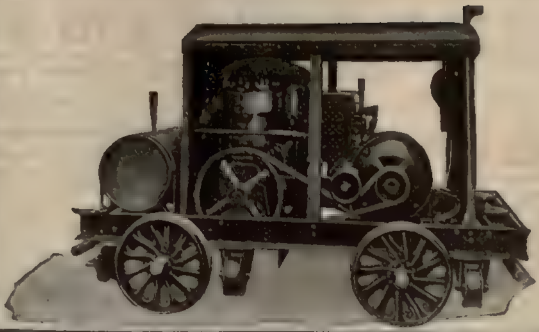

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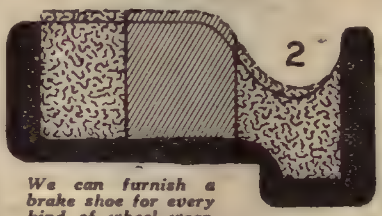

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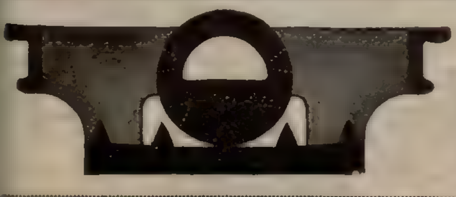

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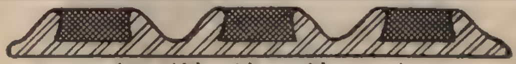

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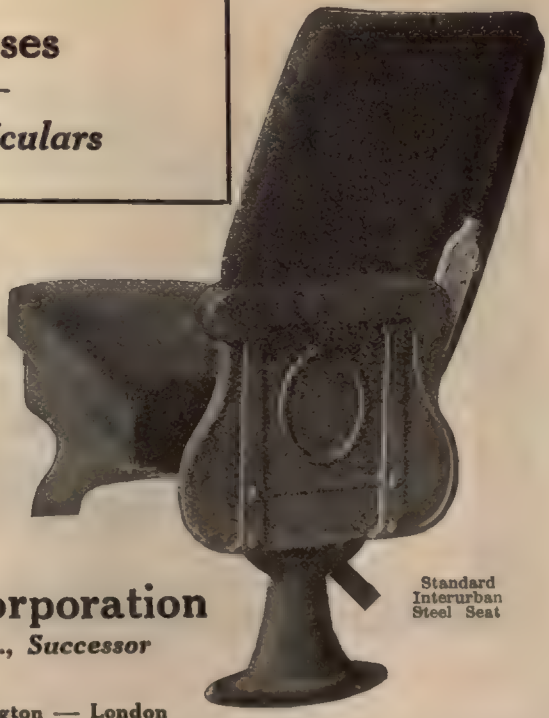

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Vol. 59, *No.* 2 New York, January 14, 1922 *Pages* 63-98

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors
HENRY H. NORRIS, Managing Editor

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Circulation of this issue 6,000

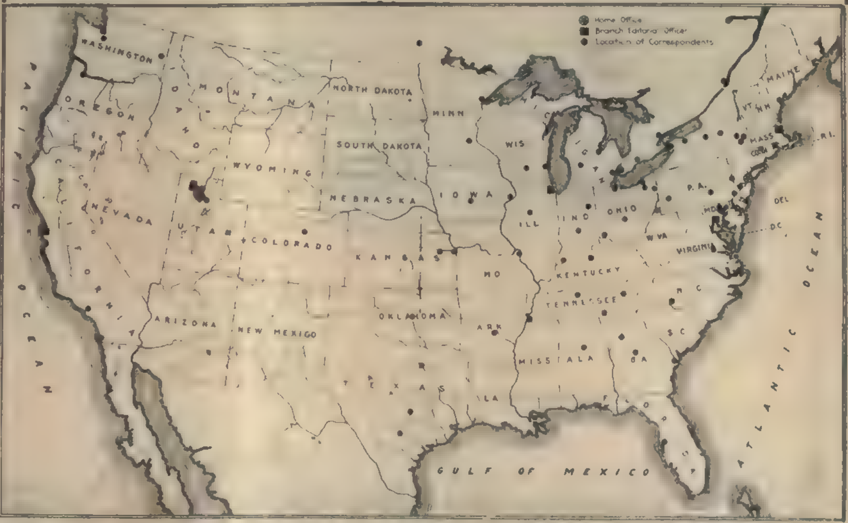
Gathering the News

MORE than 100 items of news were published in the ELECTRIC RAILWAY JOURNAL of Jan. 7. They were contained in fifteen pages. The length of these items varied from a few lines to several columns. The gathering weekly of all this news is no small job, and probably few are aware of the extent of the organization maintained to provide this service to the JOURNAL readers.

In the main, reliance is placed by the editors in the home office in New York on a corps of seventy to eighty field correspondents located in the principal cities of the country who are constantly on the lookout for items of interest to the industry. The accompanying map shows where the branch offices of the JOURNAL are located and gives a picture of where these regular correspondents are stationed. While the main responsibility is placed on the correspondents, a large number of railway men, either voluntarily or on request, supply news items from their own companies.

As a source for leads of further news items and for confirmation as to the authenticity of news some eighty daily papers from all the principal cities are carefully read by expert readers at the home office. The service is further strengthened by similar material received from several regional clipping bureaus. Accuracy and detail are of course most important, and every effort is made to verify by telephone, telegraph or letter all news of doubtful origin.

The effectiveness of this reporting service depends in no small degree upon the judicious selection and intelligent presentation of the items which are finally published from the mass of material available from all these sources.



Dots on the accompanying map indicate cities in which correspondents are located who contribute news regularly to the ELECTRIC RAILWAY JOURNAL

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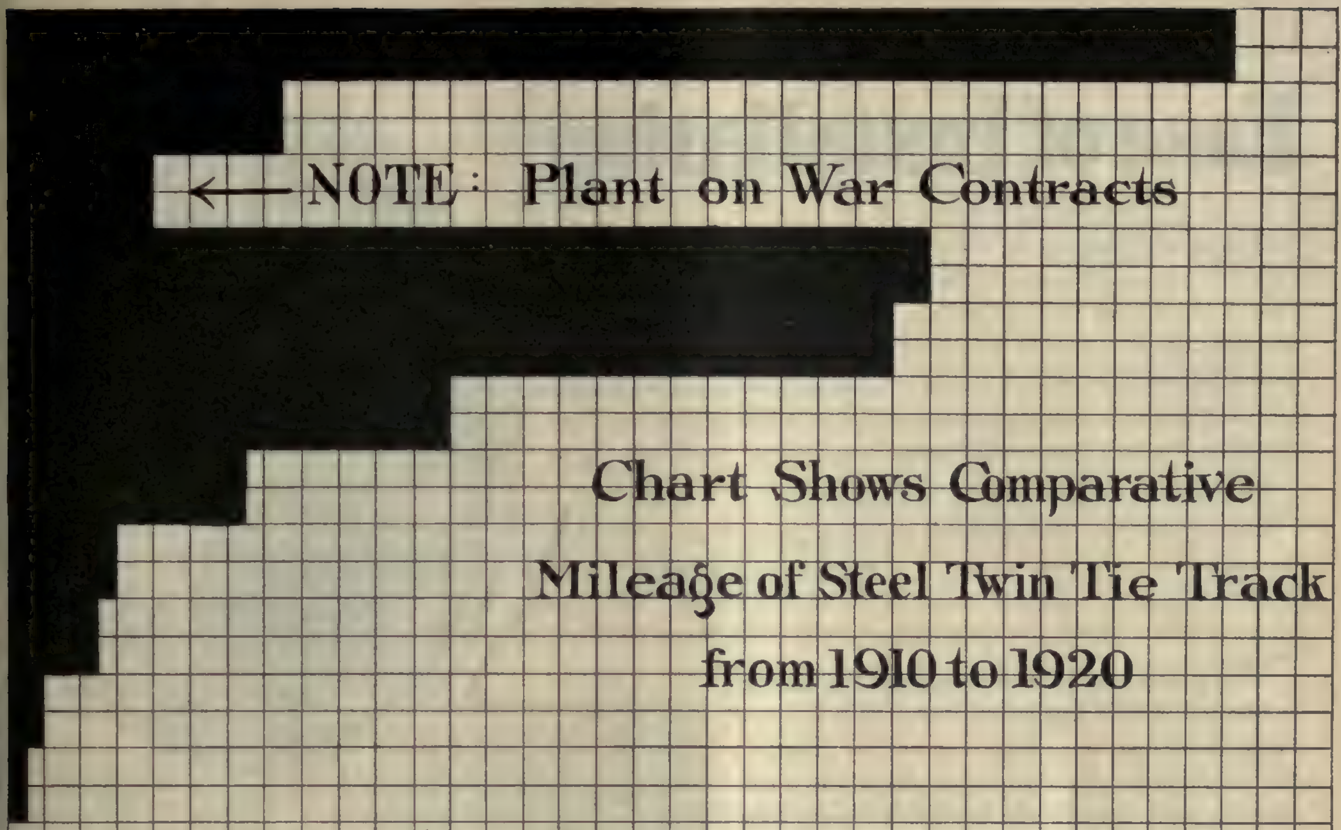

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Mileage of Steel Twin Tie Track
from 1910 to 1920

Steel Tie Statistics 1910 – 1920

The International Steel Tie Co., Cleveland, Ohio

Steel Twin Tie Track

Ease of Installation

In the large amount of data which we have accumulated concerning the use of Armco Culverts, two vital points predominate, ease of installation and permanence. Ease of installation includes not only the actual work of installing the culvert under highways and railroads, but also the ease with which they can be loaded and shipped on cars, and conveyed on trucks, wagons, mule packs or by workmen to the locations at which they are to be installed.

Local conditions effect many installations to such an extent that the installation of other forms of culverts are often impracticable if not impossible. Hence economy of transportation and ease of installation favor the selection of Armco Culverts.

Armco Culverts once installed are on the job to stay for Armco Ingot Iron from which they are made possesses that high degree of chemical purity, homogeneity of texture and heavy galvanizing that enables the metal to withstand the deteriorating action of soil and climate. Hundreds of installations made ten or more years ago and in perfect condition today prove beyond the shadow of a doubt the rust-resisting and enduring qualities of Armco Culverts.

TRADE MARK ARMCO Resists Rust Ingot Iron

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of Armco Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.

215 NORTH MICHIGAN AVE. CHICAGO

Endorsed by Universal Preference

KEYSTONE
CAR SPECIALTIES

Illuminated Destination Signs
Steel Gear Cases
Motormen's Seats
Faraday Car Signals
Lighting Fixtures
Golden Glow Headlights
Headlight Resistances
Air Sanders
Trolley Catchers
Shelby Trolley Poles
Rotary Gongs
International Fare Registers
Fare Register Fittings
Samson Cordage
Air Valves
Cord Connectors
Trailer Connectors
Automatic Door Signals
Standard Trolley Harps
Standard Trolley Wheels

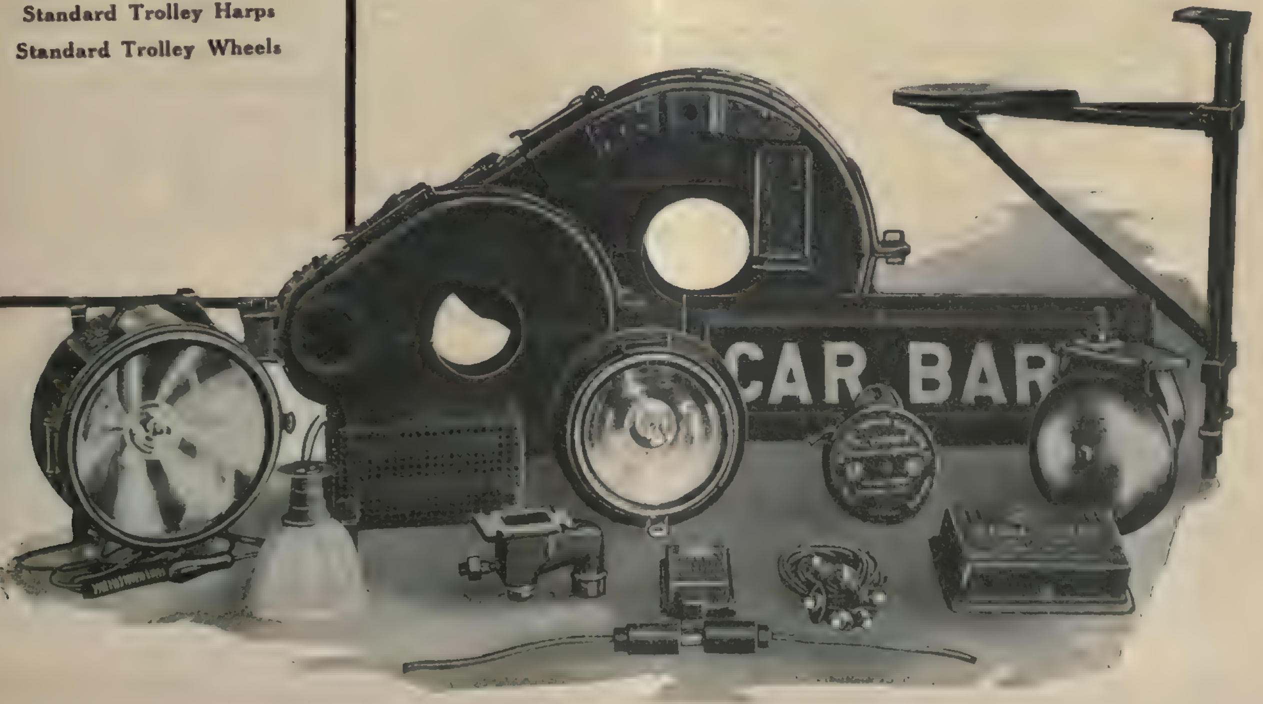
THE fingers of both hands would probably exaggerate the number of railway properties operating cars not equipped with Keystone Car Specialties. Some of the products herein enumerated will be found on nearly every car operated today. Look around and you will particularly note that Keystone-Hunter Illuminated Destination Signs, Golden Glow Headlights, Faraday High Voltage Car Signal Systems, Safety Car Lighting Fixtures and Keystone Steel Gear Cases are the rule rather than the exception. Operators prefer them and car builders approve the choice.

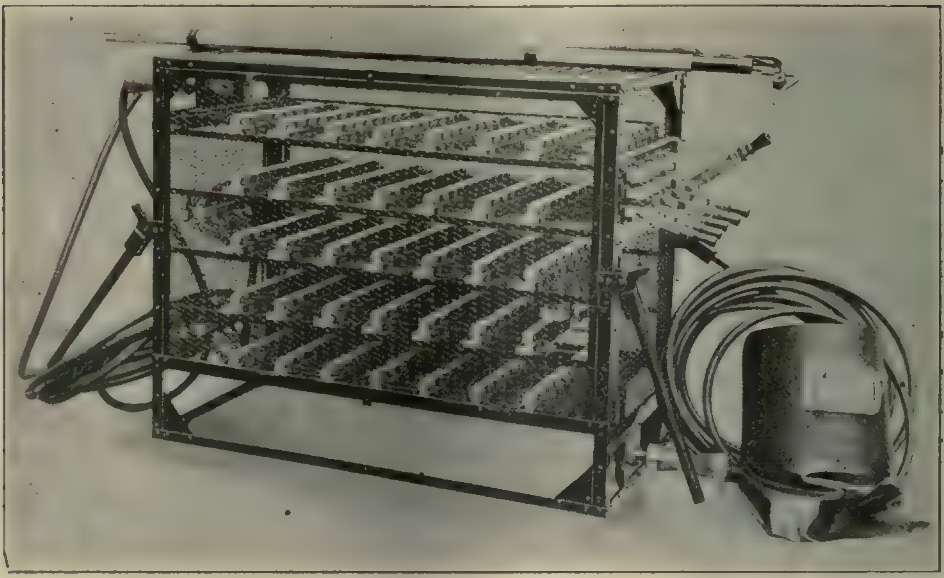
Ask for the respective data sheets

ELECTRIC SERVICE SUPPLIES CO.
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA	NEW YORK	CHICAGO
17th and Cambria Streets	50 Church Street	Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh
Canadian Distributors:
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver





Ajax Electric Arc Welder

Dress up your show-windows!

In his admirable article on the "Track Department as a Factor in the Sale of Transportation," published recently in the Electric Railway Journal, William R. Dunham says:

> *"Good Track and Pavement is the show window of the transportation sales shop. It shows what the purchaser can expect for his money........he expects and is entitled to a smooth ride for his fare........"*

Tracks Which Attract

Smooth clean-cut track attracts in two ways.

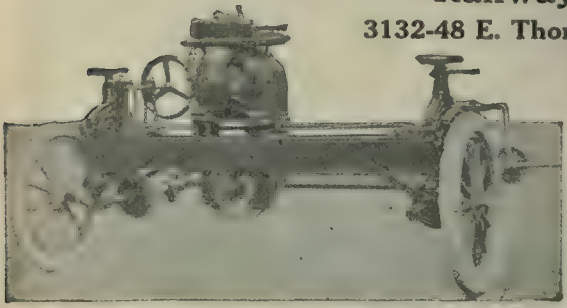
In appearance, it is pleasing to the eye—the unsightly broken-up pavement at every joint is agreeably absent. The track looks even and free from waves. An immediate impression is created of a management striving for public approval.

By its riding qualities, track of this character abolishes that oft-heard plaint: "I ride on the street cars only when I have to—they're so nerve racking."

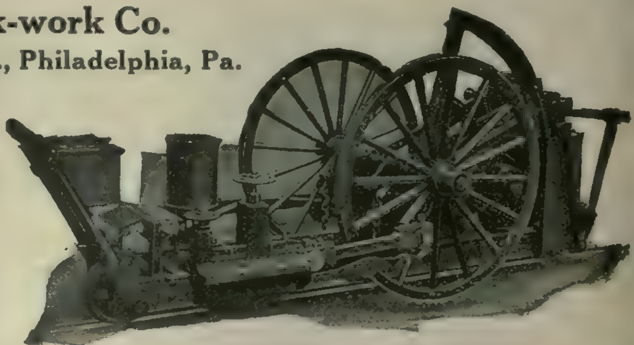
For immediate improvement of track at low cost, add to your welding and grinding equipment.

AJAX Electric Arc Welder—ATLAS Rail Grinder
UNIVERSAL Rotary Track Grinder — RECIPROCATING Track Grinder

Railway Track-work Co.
3132-48 E. Thompson St., Philadelphia, Pa.



Universal Rotary Track Grinder



Reciprocating Track Grinder

Pennies Gained Are Dividends Earned

Get an extra 3 cents on every dollar gross and you may have a 6 per cent dividend instead of just breaking even.

How to get 'em—that's the point.

One way is to arrange that the conductor has a square chance to see that every passenger pays correct fare.

The conductor doesn't get that chance whenever he's got to put his mind and his muscle on the closing of doors and the giving of signals by hand.

Give him that chance by installing appliances that do enable him to gain every cent you are entitled to get.

The collection of fare *from* every passenger; the elimination of platform accidents *to* any passenger and the production of more revenue miles from the same wage expense per hour are three ways of attaining dividends through one means, namely,

The National Pneumatic "Rushour" Line

Door and Step Control
Motorman's Signal Lights
Door and Step Operating Mechanisms
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
Originator and Manufacturer
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

Raise Your Pay With These Books

"Know electricity as experts know it, and get an expert's pay."

Big salaries are paid in the electrical field for expert knowledge. The man who knows electricity in all its many phases—the man who has completely mastered the subject from A to Z—can pick his own job and name his own salary. The only way you can earn more is to learn more. Small knowledge means small pay. Learn the way to bigger pay. Become an expert. Croft will show you how.

The Croft Library of Practical Electricity

We have clipped $8.00 off the price of this most popular electrical library—made it $19.50 instead of $27.50, a reduction of about 30%. And more than that, we are offering the easiest terms we have ever made on the Croft books. You now pay, *not* $5 a month *nor even* $3 a month, but the sum of $1.50 in ten days and the balance at the rate of *only* $2 a month. This gives you ten full months to complete your payments.

Was
~~$27.50~~
Now
$19.50

Think of getting this great Home Study Course and Reference Library at $19.50—a saving of $8.00! This is a real opportunity! No electrical worker who wants to fill a bigger job can afford to miss it. Hundreds of men have told us that the Croft Library at $27.50 was the best buy on the market. At $19.50 it represents the *biggest bargin* in sound, electrical training ever offered to the electrical workers of America.

Can you answer these questions?

1. Are you sufficiently familiar with the operating principles of motors and generators so that you can locate and correct their troubles with a minimum expenditure of time, thought and work?

2. Can you lay out the wiring in your plant so that it is in accordance with the best practice, both electrically and mechanically?

3. If you have a room or building to light can you select the lamps properly and choose the correct reflectors and locate the units at the right heights and in the proper positions?

4. Do you know enough about electric circuits so that you can figure wire sizes, resistances, and the like?

5. Do you really understand the principles of alternating currents and alternating-current circuits—power factor, inductance, reactance, impedance, permittance and the like?

6. Are you familiar with the modern electron theory of electricity which now renders easily understood so many things about electricity that were obscure formerly?

7. If you have to wire an old building with concealed wiring, do you know just how to go about it? Do you know all the time-saving stunts in fishing wires, boring raceways, and how to make the tools required?

8. Do you know the National Electric Code Rules and the reason for their adoption?

The Croft Library answers these and thousands of other questions.

Free Examination—No money down

Croft has had an almost sensational climb. Beginning as an apprentice lineman, he went through the various stages of wireman, draftsman, etc., until he attained the position of electrical engineer with one of the great electrical manufacturing companies. Now he heads his own consulting company with a large and successful practice, and his name is known in every corner of the electrical world.

Only Boiled-Down Facts

Croft gives you only the boiled-down records of everyday electrical practice. His knowledge of electricity has been obtained through actual shirt-sleeve practice, and because he knows your problems he is able to tell you in clear understandable language the best way to solve them.

Consider the Small Cost

The Croft Library has always been the leader among the higher grade electrical libraries. Now at its new price of $19.50 it becomes the biggest value in electrical books on the market. Men who are using Croft will tell you that no set of electrical books published, regardless of price, can equal the Croft Library in completeness, up-to-date-ness and all-round practical value. The price is cut, but not the value.

10 months to pay

We want you to test our statements—we want you to compare the Croft books with others. Fill in and mail the coupon attached and we will send you the entire set of eight volumes for ten days' Free Examination. We take all the risk—pay all charges. You assume no obligation—You pay nothing unless you decide to keep the books. Then $1.50 in ten days and the balance at the rate of $2 a month. Send the coupon NOW and see the books for yourself.

Send no money—just the coupon!

Free Examination Coupon

McGraw-Hill Book Co., Inc.,
370 Seventh Ave., New York

Gentlemen:—Please send me the Library of Practical Electricity (shipping charges prepaid), for 10 days' free examination. If satisfactory I will send $1.50 in ten days and $2 per month until $19.50 has been paid. If not wanted, I will write you for return shipping instructions.

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Home Address ....

City and State ....

Where Employed ....

Occupation ....

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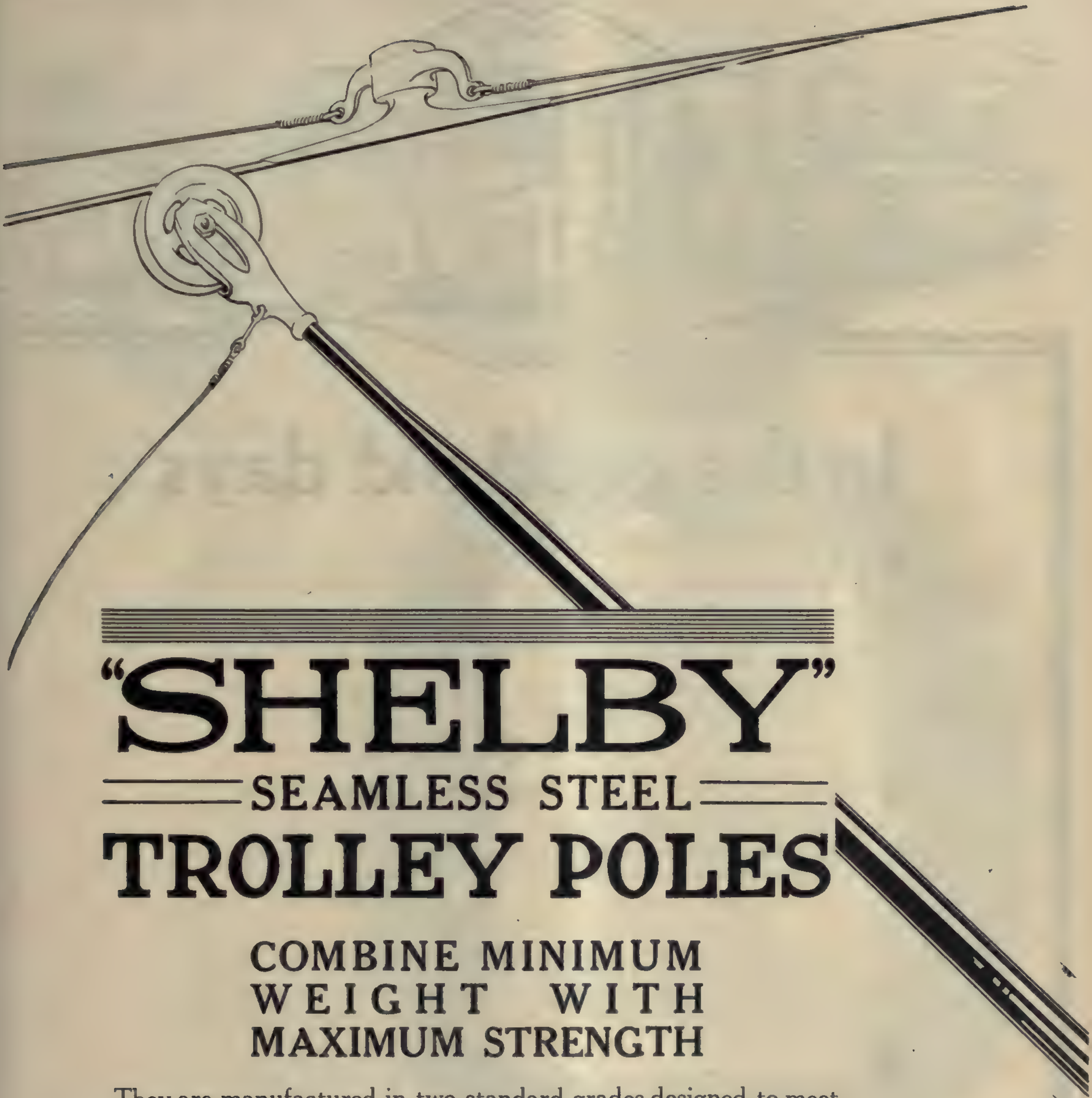


"SHELBY"

SEAMLESS STEEL
TROLLEY POLES

COMBINE MINIMUM WEIGHT WITH MAXIMUM STRENGTH

They are manufactured in two standard grades designed to meet the different requirements as to strength and service imposed by beam stresses, shock, and other conditions regularly encountered in trolley operation, and are thoroughly tested before leaving the mill.

THE RECOGNIZED STANDARDS OF SEAMLESS STEEL TROLLEY POLES

Ask for Booklet, "The 'SHELBY' Seamless Cold Drawn Steel Trolley Pole"

NATIONAL TUBE COMPANY

General Sales Offices: FRICK BUILDING, PITTSBURGH, PA.
District Sales Offices in The Larger Cities

STEEL FOR SERVICE

In the good old days

ABOUT this time of the year the newspapers would carry cartoons and humorous paragraphs about "Tottering New Year's Resolutions."

However, "New Year's Resolutions" have gone somewhat out of style.

But there still remains at this time the human disposition to take stock of last year's accomplishments and delay plans for next year's activities.

Now as to Last Year:

We have had a wonderful year. Not only from the standpoint of sales of Texaco Lubricants to Electric Street Railways—but because of the great number of friends we made—and because of the large opportunity we have had to demonstrate how helpful interest and constant co-operation make for the kind of efficiency-results that insure permanent business relations.

FOR THIS YEAR:

To our present customers (and including the gratifyingly large number of Street Railway Systems who turned their business over to us this month), we can say this: You will receive the same high quality Texaco Lubricants, which brought you to us and a full measure of scientific Lubrication Engineering Service.

Texaco Service does not stand still. It follows the progress of mechanical developments—it anticipates it, as a matter of fact—and at all times operates to aid in the work of keeping cars moving at lowest FINAL cost for operation and repairs.

Frankly we are growing—because we deserve that growth.

We deserve that growth because we have nailed this banner to our masthead:

THE RIGHT OIL—AT THE RIGHT PLACE

AT THE TIME YOU NEED IT.

There is a Texaco Lubricant for Every Purpose

TEXACO

THE TEXAS COMPANY

DEPT-R-J- 17 BATTERY PLACE - NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES

TEXACO

Standard Helical Gears

Special Drop Forged Blanks

give pinions with a comparable longitudinal and transverse strength.

An Operator Reports

"The results obtained with Helical Gears have been satisfactory to the Company, and our patrons have frequently commented on the noiseless operation of the cars. Taken as a whole, I consider our Helical Gear Equipments exceptionally satisfactory for the service."

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products.

In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

Why do they all single out Tool Steel Gears and Pinions?

In the American Association magazine, AERA, December, 1919 and January, 1920, someone put the following question:

E-e-347 Will you please give your opinion of a good, fair mileage for treated, untreated, hardened and tool steel gears and pinions?

The following answers were received and printed:

E. C. FOSTER, *President,* MANCHESTER STREET RAILWAY CO., MANCHESTER, N. H.—Non treated gears city traffic, 50,000 miles; interurban, 75,000 miles. Making tests on hard steel gears.

R. L. JONES, *Master Mechanic,* MASSACHUSETTS NORTHEASTERN STREET RAILWAY CO., HAVERHILL, MASS.—I have no absolute correct data on treated and untreated gears. We have some tool gears and pinions that have run 275,000 miles and have shown hardly any wear.

F. H. HARRIS, *Superintendent of Equipment,* CHARLESTON CONSOLIDATED RAILWAY AND LIGHTING CO., CHARLESTON, S. C. At present we are using nothing but tool steel gears and pinions, except on some new equipments, but as we have as yet not worn any out, we can not give any definite information on this subject.

H. W. DEININGER, *General Superintendent,* IOWA SOUTHERN UTILITIES COMPANY, CENTERVILLE, IOWA.—We get approximately 250,000 miles from untreated pinions, or about four years' daily service on untreated gears. We have some on which we have kept a record, which have run 385,000 miles with very little signs of wear. Will probably reach 500,000 or 600,000 miles.

C. H. NELSON, *Superintendent,* GRAYS HARBOR RAILWAY & LIGHT CO., ABERDEEN, WASH.—Indefinite; practically no trouble.

RALPH A. GILL, *Manager's Secretary,* EL PASO ELECTRIC RAILWAY CO., EL PASO, TEX.—For treated tool steel gears, 300,000 miles. Pinions 180,000 miles.

EDWARD A. WEST, *General Superintendent,* THE DENVER TRAMWAY CO., DENVER, COLO.—In Denver service untreated pinions average 40,000 miles; treated average 55,000 miles. *Tool steel pinions running with tool steel gears average* 300,000 *miles.* Tool steel gears for which we have mileage records show 755,661 miles.

C. C. SLATER, *General Superintendent,* THE COLUMBUS RAILWAY, POWER & LIGHT CO., COLUMBUS, O.—It is impossible for us to give a fair answer to this question as operating conditions are the determining factors in gear life.

SUMMARY

Six definite answers, of which four companies regularly using Tool Steel gears. (and look at the dandy records they show) one company is testing, one company satisfied with untreated. No one seemed sufficiently enthused about those "just as good as Tool Steel—special quenched gears" to even record their tests.

The "live wires" of the industry who follow tests and use the question box for the experience of others are almost always "boosters" for Tool Steel gears.

There's a Reason!

Saving—or Shaving?

Suppose that in the lubrication of your rolling stock you use approximately 5,000 gallons of electric car oil a year. Again, suppose that you have been using *Galena* Electric Car Oil; you are offered a car oil "just as good" for two, three or five cents a gallon lower in price. At the most, you can "shave" costs down about $250.00.

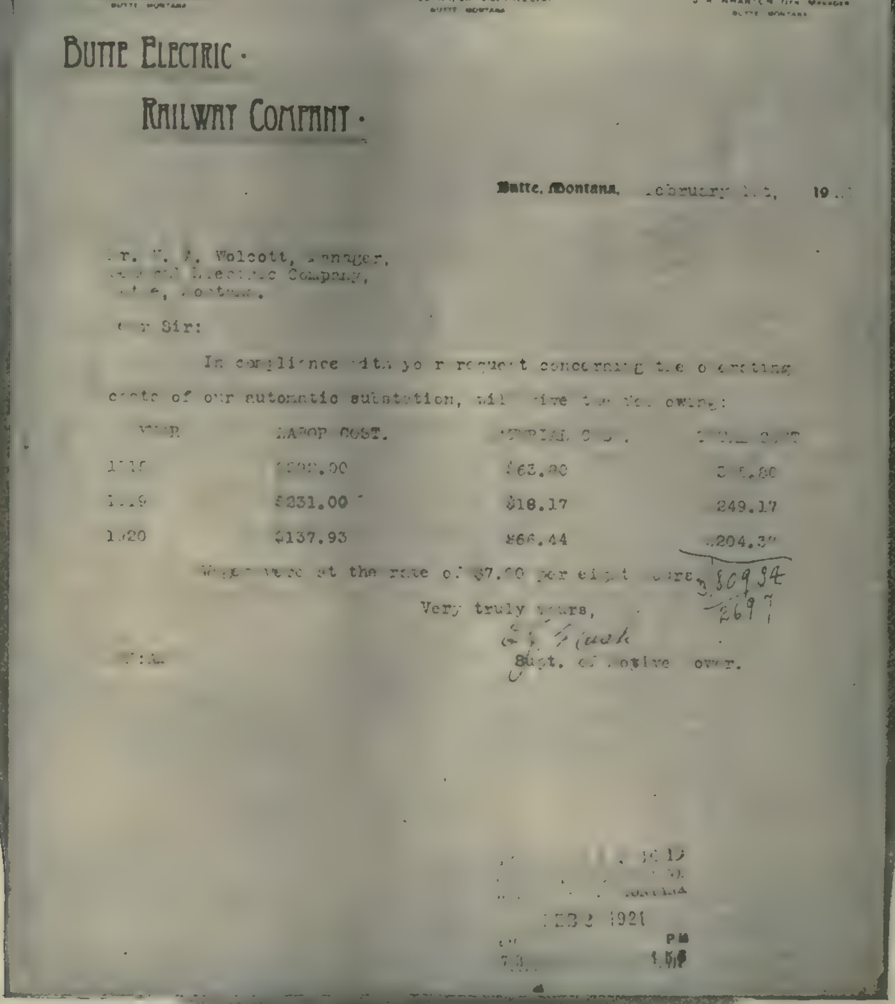
But how about *saving?* At the end of the year you find that instead of using 5,000 gallons, you have used at least half as much again; that reports from your mechanical department show that increased costs in repairs and replacements of bearing parts amounted to even more than the entire cost of the oil; that your time losses due to hot boxes and extra oilings will alone wipe out the "shaving."

And there is really no supposition about it—this very thing has happened, and will happen, every time that *shaving is* mistaken for *saving,* that bulk is considered instead of quality.

Experience, after all, is the best teacher. It has taught many railway officials that it is not only unwise, but unsafe and expensive, to gamble with the lubrication question. It has been the deciding factor that has influenced many purchasing agents—seeking real dollars and cents saving—to specify the ever reliable Galena Oils, the lubricants that have proved by actual cost records on over 500 electric properties, their unequalled efficiency and economy.

Galena-Signal Oil Company
New York - Franklin, Pa. Chicago
and offices in principal cities

After all, the one conclusive proof of automatic station economy is a highly favorable actual performance record



W. A. CLARK PRESIDENT
BUTTE MONTANA

W. A. CLARK, JR. VICE PRESIDENT
BUTTE MONTANA

J. R. WHARTON GEN. MANAGER
BUTTE MONTANA

BUTTE ELECTRIC
RAILWAY COMPANY

Butte, Montana, February [illegible], 19[illegible]

Mr. [illegible] Wolcott, Manager,
General Electric Company,
Butte, Montana.

Dear Sir:

In compliance with your request concerning the operating costs of our automatic substation, will give the following:

YEAR	LABOR COST.	MATERIAL COST.	TOTAL COST
[illegible]	$[illegible].00	$63.80	[illegible].80
1919	$231.00	$18.17	249.17
1920	$137.93	$66.44	$204.37

Wages were at the rate of $7.00 per eight hours.

809 34
269 7

Very truly yours,

Supt. of Motive Power.

FEB 2 1921
PM

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

54C-52

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor
C. W. SQUIER, Associate Editor
CARL W. STOCKS, Associate Editor
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B. E. PLIMPTON, Editorial Representative
PAUL WOOTON, Washington Representative
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ROBERT M. HAIG, Consulting Editor

Volume 59 New York, Saturday, January 14, 1922 *Number* 2

Thrift Week Begins Tuesday, Jan. 17

THE name of Benjamin Franklin is associated with the idea of thrift in this country, and it would be well if our people as a whole understood and followed the advice of this philosopher and statesman in this respect more than they do. His name is a worthy one to associate with this movement because while being thrifty and preaching thrift he never carried the virtue to excess, where it becomes niggardly. Franklin's idea was that thrift meant the expenditure of money wisely and without waste.

Franklin's birthday anniversary, Tuesday, Jan. 17, will be celebrated again this year by a country-wide effort to promote thrift. A campaign will be inaugurated on that day to promulgate this tenfold creed: Work and earn; record all expenditures; make a budget; have a bank account; carry life insurance; own your home; make your will; pay your bills promptly; invest in safe securities; share with others. These are the principles followed by all really thrifty people. They will serve as a standard for all self-respecting electric railway men who wish to safeguard the future and maintain a reputation as substantial members of the community.

Thrift associations have been formed on a number of electric railway properties, but there should be more of them. The railway company has the organization by which it can assist employees to save and invest. More of this work should be done.

Have Fares Come Down as Much as They Should?

THIS is a question which is being asked in a number of cities.

The armistice was declared in November, 1918, or more than three years ago. Considerable reductions have since been made in the price of commodities and in the cost of living. According to the Bureau of Labor Statistics of the United States Department of Labor, the index number for the retail prices of the principal articles of food, weighted according to the average family consumption in 1901, had come down to 153 in October, 1921, as compared with a maximum of 219 in June and July, 1920. People generally, whether employers or employees, do not have as much coming in as formerly, yet the average fare for city lines in December, 1921, according to Professor Richey, is within 1 per cent of the maximum of 7.24 cents in May, 1921.

One reason that fares will be, and ought to be, slow in coming down is that they were slow in going up, and in this connection it is noticeable that in the figures from which the quotation just given was made the "peak" was not reached until May, 1921. In December, 1920, the average city fare was only 7.14 cents.

Another reason that fares will be slow in coming down is that they have not far to fall, compared with other prices. If 1913 is used as a basis, it will be found that railway materials rose 147 per cent, wages 132 per cent, wholesale commodities from 118 to 172 per cent, and cost of living 104 per cent, yet street railway fares increased only 49 per cent from 1913, and in that year were generally recognized as inadequate to give a fair return to the railway company. Again, as has been pointed out previously in these columns, even if the average fare should be proved to be too high, which it is not, a period should be permitted during which the company can build up its property as well as its credit so that it may be in a position in the future for normal and healthy growth as conditions demand its expansion.

After the present period of industrial depression has passed, a period will come when there will be a great demand for transit facilities. Obviously it is a wise policy now for every city to encourage rehabilitation of these companies, both financial and physical, so that they shall be prepared to carry out their future duties as common carriers.

Educational Committee Activity of American Association Is Rejuvenated

AFTER a lapse of several years the American Association has again appointed a committee on education. Such a committee is now provided for in the constitution. The new committee has sent out a preliminary outline of its program, which is comprehensive and well considered. The committee asks for the co-operation of the membership. This should be freely and cheerfully accorded, because one of the fundamental needs of the industry collectively and in its individual units is education. If the committee can this year contribute toward meeting this need, it may properly commandeer whatever it needs in the way of assistance from the electric railways of the country.

For several years the American Association had an active committee on education. Its work was well received and commanded the respect of managers, but the results were found not to be commensurate with the effort necessary to get anything over. The industry apparently was not ripe for concerted effort in employee training. The suggestions made by the committee received tacit assent; the committee's experiments were supported financially and aroused some interest, but in general nothing vital resulted. Possibly this was because ten years back the industry was enjoying a degree of prosperity, and thus electric railway managers did not feel the need for employee training. Possibly, also, the need is felt now acutely enough to warrant a new investment in time and energy on the part of a committee on education. The membership has an opportunity, by prompt response to the committee's request, to show that the need is appreciated.

The earlier committee did a number of practical things that may properly be recalled at this time. For example, it prepared and promulgated a scheme for a cadet system to prepare young men, particularly college graduates, for positions of responsibility. This was given a demonstration on a considerable scale by the Public Service Railway, with good results. Other railways also presumably did the same on a smaller scale. Then the committee conducted a correspondence course for picked groups of employees which was financed by a small group of railways. The results of this tentative course were good. It was not the idea of the earlier committee that the association itself should become a training school, but it was hoped that the experience gained in these demonstrations would be of direct use to the members. Undoubtedly it was of some use, but it is only fair to the committee to say that the net result was disappointing.

The new committee, under the chairmanship of Edward Dana of the Boston Elevated Railway, is well selected for the purpose which has been outlined in the letter sent to member companies. The program covers all phases of training of present employees and of securing desirable recruits. Let's give the committee a good boost.

Insurance a Gyroscope in the Railway Industry

INSURANCE is an asset whose value is realized when disaster occurs, and the old saying that "hindsight is always better than foresight" applies to insurance with peculiar aptitude. It is a financial gyroscope for the railway industry which functions to stabilize the invested capital and the existing labor relations during tempests, fires, strikes, earthquakes or other "acts of God."

Time and theories and insurance policies are ever changing, and the latest development in insurance has been the rapid growth of a type of insurance designed to fix and nurture pleasant relations between employer and employee and financially and temperamentally to improve the moral and mental status of the employee. Such social insurance is the keystone in many railway social structures and acts as a nucleus around which to build up mass morale and *esprit de corps*.

To many railway executives, especially in these hard times, the most evident feature of insurance is its cost —it is classed with taxes—and they are tempted to decrease the amount of the existing insurance and are not in the least anxious to look into or take out policies embodying the new ideas in insurance.

All human beings are inclined to be both optimistic and fatalistic and dislike to borrow trouble or think of such disagreeable things as a financial loss, a strike or other business catastrophe. Like gamblers, people believe in "luck" and like to take a chance—all in keeping with the improvident reputation of Americans.

Railway executives are human and Americans and some of them have the national traits. Then again some of them look upon an insurance agent as a leech bent only upon sucking their blood and do not appreciate the curative properties of a good blood-letting. Others surrender to all types of insurance in order to avoid a wordy argument or in order to play safe and then think they have accomplished the full result from insurance by locking a few policies in a fireproof safe. Still others think all insurance is alike and choose the company with which to do business because the agent who represents it in their city is a personal friend.

Fire insurance is a necessity for railway properties and is subject to many economies, yet no concerted attempt has been made by the railway executives to consider the subject on a national basis or to formulate ideas as to proper contractual conditions. Each property provides for its insurance in a manner that results from a study by the local organization and may carry its own insurance, join a mutual association or take out a policy with an old line company without comparative study of the methods and sometimes even without a detailed study of the policy clauses. Of course it is a complicated and technical business, and it is difficult to see how co-operation can help the railways, but, in principle, such co-operation is needed to secure economies.

Social insurance is pretty well standardized as to policy clauses and premiums, but each railway embarks on an uncharted sea in attempts to inaugurate the policies and adapt them to its specific organization. Such insurance is a splendid agent to cement an organization and to enable the employee to maintain his self-respect, because he can look at the future with confidence. Its possibilities are unlimited and its greater development is warranted. The critical element of human relations, however, enters into its operation and renders it an operating asset or liability, depending on how it is managed and maintained.

Liability, strike, catastrophe, motor bus and other special forms of insurance are new and rather expensive. On paper the ideas are good, but time alone will determine the economic status of some of the special types.

On the whole, insurance is a competent, well-organized business and railway companies can expect few economies through reducing insurance rates unless the risk is reduced at the same time. As a specific proposition, however, many railway properties can use more insurance, better types of insurance, and can make reductions in the cost of existing insurance if they have available a better knowledge of the insurance business and secure better co-operation from their executives in a co-ordinated study of the possibilities of insurance as an operating asset.

Richmond Company Forced to Retrench

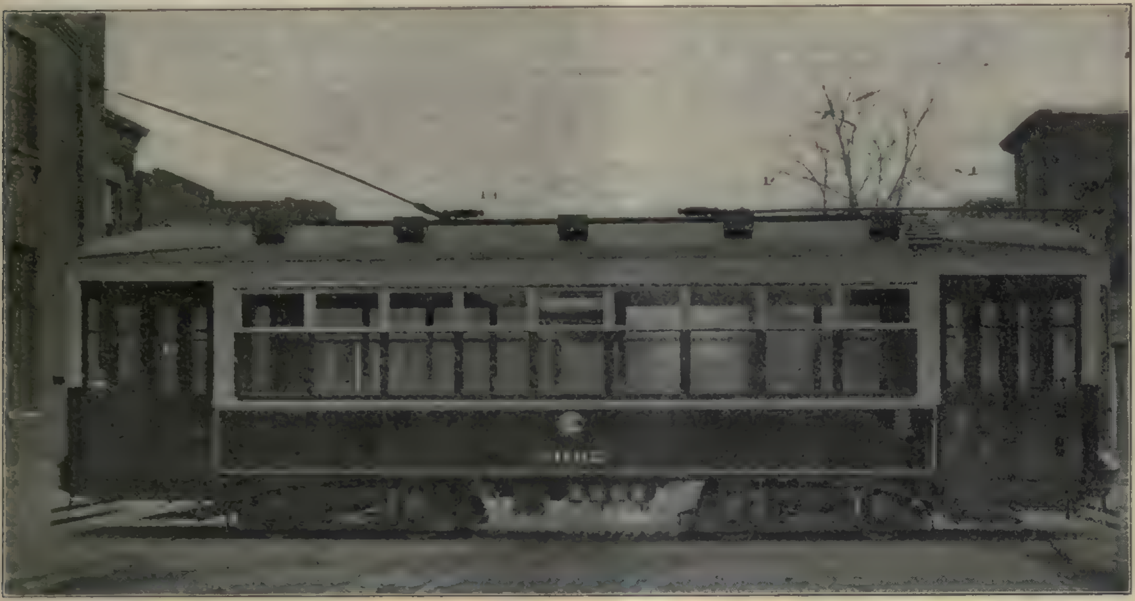
THE railway at Richmond, Va., has announced a drastic wage reduction effective Jan. 16. Naturally the reduction falls heaviest on the new men. Under the revised scale they will be paid 30 cents an hour instead of 43 cents. The general decline in industrial activity and the growing popularity of the private automobile have been contributing factors to the ills of the company, but the principal cause of the company's troubles has been the unregulated jitney competition in Richmond on routes served by street cars. The extent to which the company has suffered is best shown by the statement that for the year ended July 1, 1921, the railway system failed to earn operating expenses and fixed charges by $553,887. Since then the situation has grown steadily worse.

The answer to the company's troubles is not hard to find. It needs a new deal all around. It needs a new franchise. It needs relief through jitney regulation prohibiting operation along the routes served by street cars. It needs relief from paving and other burdens. If it does not secure them the outlook is for still greater retrenchment by the company all along the line. This is the only course left open now. Whether the company is forced again to resort to the expedient of retrenchment depends upon the degree of intelligence and the promptness with which the Council answers the company's plea.

Two New Types of Safety Cars for Chicago

A Single-Truck and a Double-Truck One-Man Safety Car, Both Arranged for Double-End Operation, with Separate Entrance and Exit Passageways and a Unique Gate Barrier in the Exit, Have Been Built for Trial by the Chicago Surface Lines

BY CHARLES GORDON
Engineer of Equipment Chicago Surface Lines



CHICAGO'S NEW DOUBLE-TRUCK SAFETY CAR

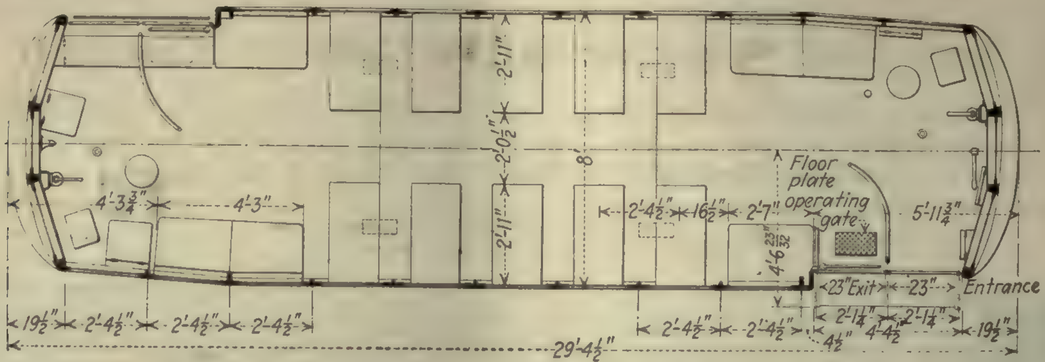
THE Chicago Surface Lines has recently placed in operation two sample double-end, one-man safety cars embodying some developments from existing types both as to design and details of construction. One of these cars is of the single-truck type equipped with two 25-hp. motors and the other is equipped with double trucks and four 25-hp. motors. The single truck car is 29 ft. 4½ in. long over the bumpers, 8 ft. wide over the side girders and weighs 16,375 lb. complete. The double-truck car is 37 ft. 2 in. long over the bumpers, 8 ft. 6 in. wide over the drip rails and weighs 28,050 lb. complete. These cars were designed and built at the West Shops of the company, under the direction of H. H. Adams, superintendent of shops and equipment.

This company began the operation of one-man safety cars on its system in February, 1921, with ten standard Birney single-truck cars purchased from the J. G. Brill Company. They are 28 ft. ½ in. long over all, 7 ft. 8 in. wide, weigh 16,600 lb. complete and are arranged for double-end operation with the usual single doorway at each end for both entrance and exit of passengers. Experience with these cars on some of the outlying lines in Chicago proved them to embody certain limitations, even for such service. Most important of these limitations are the following: (1) Excessive time for passenger interchange due to single doorway; (2) congestion within the car due to narrow aisle and restricted space for movement of passengers at the front end, and (3) excessive damage to the car from comparatively light collisions.

A careful study was made of these various factors to determine whether they could be overcome. It became apparent that their elimination would produce a car much better adapted for operation in Chicago. It was thereupon decided to build a sample car embodying the changes desired. The plans provided for maintaining, or even reducing if possible, the weight as represented by the ten safety cars then in service. This was accomplished, despite the fact that the construction of the end framing was stiffened by using heavier members, that a separate entrance and exit was provided and the aisle made wider. The seating arrangement was also changed to avoid congestion at the front cross seats and an attempt was made to improve the general lines and appearance of the car.

The desires for a separate entrance and exit, combined with one-man operation, presented some difficulties. It was apparent that the chief objection to a double opening was the extra supervision required of the motorman. The use of any selector arrangement for the independent operation of the entrance and exit doors would have imposed additional duties on the motorman, whereas the simultaneous opening of both doors at points where a large number of passengers board the car would result in two streams of entering passengers, making a difficult fare collection problem.

As the first step in the solution of this problem, it was decided to open the doors simultaneously, but to incorporate in the exit passage an automatic locking barrier or gate, which would allow the free exit of alighting passengers, but effectively prevent boarding passengers from entering on the exit side. This device, as worked out, is entirely automatic in its operation and allows the motorman to give his entire attention to the collection of fares. It provides the desirable double passageway and avoids confusion during a heavy interchange. The operating mechanism consists of a large treadle plate in the car floor, so placed that it is naturally stepped upon by passengers approaching



General Plan of Chicago Sample Single-Truck, Double-door Safety Car

the gate. The resulting depression of the treadle releases the gate, so that when the doors are opened by the operator at a stopping point passengers are free to alight by pushing the gate open. The gate is counter-weighted to swing shut automatically. The mechanism is very simple, but in designing the apparatus it was found very important to obtain reliable operation with a minimum treadle depression. The equipment now in service requires a treadle depression of less than ¼ in. for successful operation. The general appearance and arrangement of the barrier and treadle are illustrated in the accompanying photographs.

These barrier gates have been in service on the sample single-truck car since the early part of September, 1921, and on the double-truck car since the middle of December. They have been carefully studied under various operating conditions and have been found to accomplish their purpose in an entirely satisfactory manner. They successfully separate the entering and leaving passengers at points of heavy interchange and require no supervision from the operator. Both outside doors are opened and closed simultaneously from the brake valve handle.

Observations on the operation of this gate mechanism have recently led to a further development. It was originally believed, and has since been demonstrated by full size working models, that it is not only feasible to separate the entering and leaving passengers by a barrier such as has been provided on the two sample cars but that the exit door itself can be used for this purpose and made entirely automatic in its operation. That such operation can be made practical and safe has also been demonstrated.

The automatic exit door as now constructed in this full size model is operated by an independent door engine mounted on the header. The valve of this engine is controlled by the same kind of floor treadle that was used to release the gate barrier. The closing motion of the valve after a passenger has left the treadle is delayed in such a manner as to provide plenty of time to enable him to clear the door before it starts to close. The device is also so constructed that a succession of passengers passing over the treadle will not result in flapping the door back and forth.

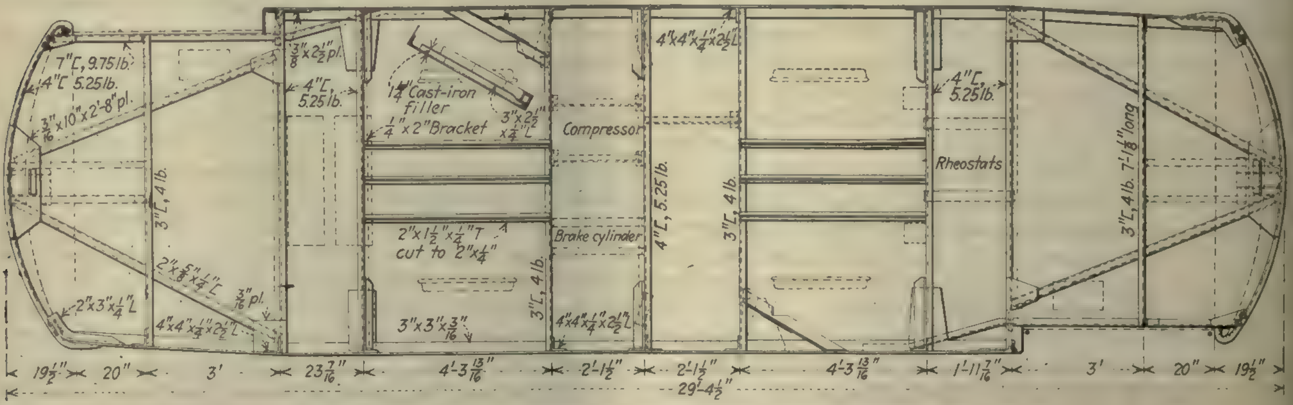
This automatic door arrangement has been assembled at the West Shops of the company. It is believed that the application of this device to cars in service will prove its practicability and solve an important and difficult problem connected with one-man car operation.

Single-Truck Car Construction Features

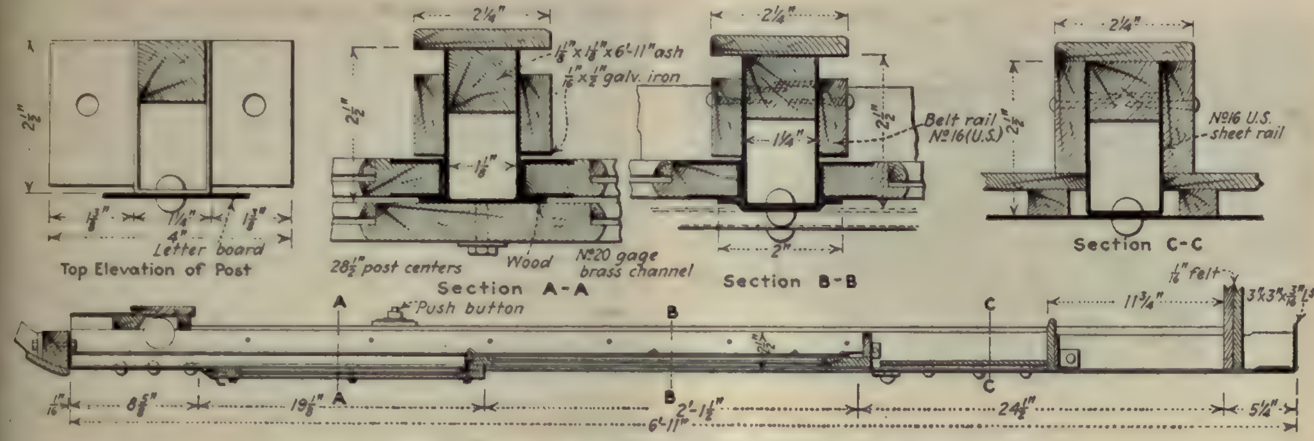
Two photographs of the sample single-truck car are included, one showing a three-quarter view of the completed car and the other a three-quarter view of the steel frame. The general dimensions are as follows:

Length of car over bumpers	29 ft. 4½ in.
Length over corner posts	17 ft. 4½ in.
Width over side girders	8 ft.
Seating capacity	36
Width of aisle	24½ in.
Entrance and exit passageway widths	23 in.
Height rail over trolley boards	10 ft. 6 in.
Height rail to top of floor	37 3/16 in.
Height bottom of side girder over top of side post	6 ft. 11 in.
Height top of floor to top of arm rest	24½ in.
Side post centers	28½ in.
Wheel base of truck	8 ft.

The seating arrangement and floor plan are shown in the accompanying drawings. Ten cross seats of the reversible type with full spring cushions and thin type backs are provided. They are rattan covered and are 35 in. from inside lining of the car over the aisle plates. These seats are a decided improvement in comfort, appearance and weight over those generally used in cars of this type. They weigh 49½ lb. per seat as against 51½ lb. for the non-cushion seats provided as standard equipment. Longitudinal seats are



Steel Frame Construction of Single-Truck Chicago Safety Car



SPECIAL DESIGN OF SIDE POST FOR CHICAGO SAFETY CARS

placed at the ends to allow space for the movement of passengers. Folding seats are provided for use at the rear end of the car. The platform floor is continuous with the body portion. By carrying the floor only 27⁷⁄₁₆ in. above the rail, it was possible to make the step 14 in. above the rail and 13⁷⁄₁₆ in. below the car floor. This low step height was considered desirable for facilitating the movement of passengers. The low floor entailed the use of shallow wheel boxes over the wheels.

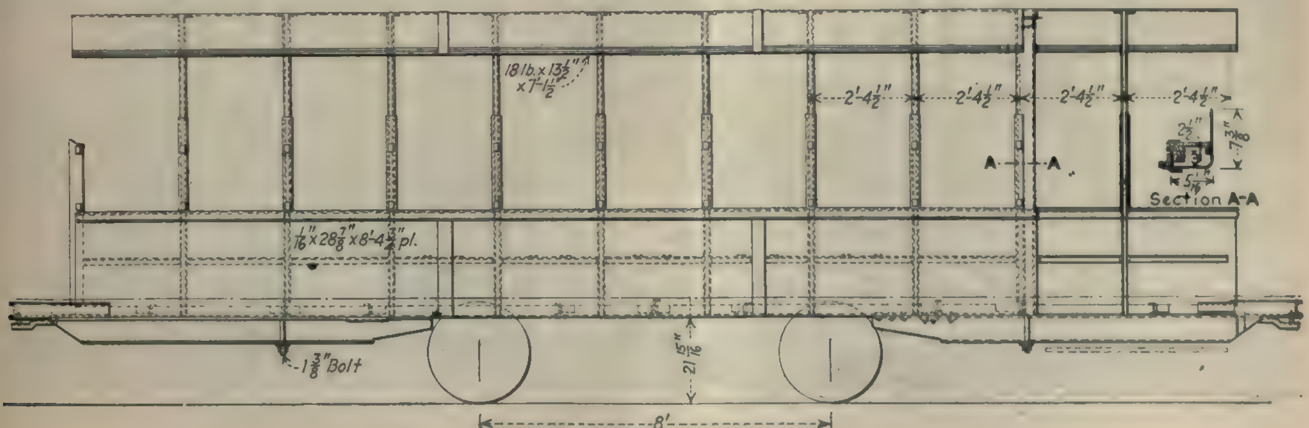
For the purpose of improving the appearance of the car, the side framing is tapered toward the center from the second side post to the vestibule corner post. The wide panel at the right-hand vestibule corner post, as one enters the door, which appears on many of the present type single-truck cars, has been eliminated. The body header is carried from the corner post to the opposite side post and the curvature of the bumper and dash have been increased.

The construction of the side posts is one of the features that have made possible the light weight obtained. They are clearly illustrated in the accompanying photographs and drawings. They are made of No. 16 gage sheet steel formed into a "U" shape with the closed side of the U out. The completed post is 1¼ in. wide x 2½ in. deep. Into the open end of the "U," which faces toward the interior of the car, a 1⅛ in. x 1⁵⁄₁₆ in. wood filler is screwed to form a screwing strip for the parting strips and pilasters. The closed side of the "U" is riveted to the side girder with a single row of ⁵⁄₁₆-in. rivets. The fillers are arranged so that they can be readily removed for painting the interior of the posts whenever it becomes necessary. To provide outer guides for the lower sash, capping pieces, also formed of No. 16 gage steel, are riveted to the closed side of the "U" between the belt rails and the upper sash. This construction is considerably stiffer than the "T" iron type of post or the types of wooden posts generally used and is lighter than either.

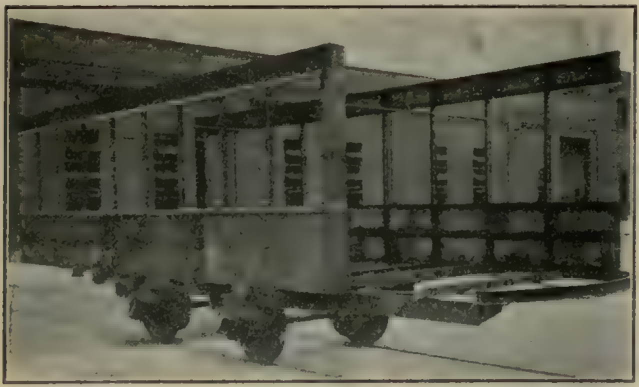
This type of post was adopted after a thorough test of various designs in use and under consideration. The tests were conducted primarily to determine the stiffness of the sections both in a direction parallel with and across the car. They were fastened for the tests in a manner similar to their actual installation in the side girder. The load was applied at a point corresponding to the location of the top plate. Stiffness of the member combined with light weight were the primary considerations which led to the adoption of this design. It also makes a convenient and inexpensive design for assembly into the steel frame. The sides of the "U" are flanged out at the upper end to form a footing for the top plate and carlines.

STRUCTURAL DETAILS

The corner posts are formed of No. 16 gage steel flanged at the upper end to form supports and ties for the body top plates, body header and vestibule door header. The side girders are formed of No. 16 gage steel reinforced at the lower edge with 3-in. x 3-in. x ⁵⁄₁₆-in. angles and at the top edge under the belt rail with 1¾-in. x ¼-in. flat bars. The belt rails are made of No. 16 gage steel formed to shape and extending in between the posts as a support for the arm rests. The cuts in the belt rails for the posts



STEEL FRAME CONSTRUCTION OF SINGLE-TRUCK CHICAGO SAFETY CAR



STEEL FRAME OF CHICAGO SINGLE-TRUCK SAFETY CAR

were made in such a way as to produce two clips extending alongside each post, which are riveted in place. This produces a substantial tie between the side posts and the belt rails.

The platform knees are made of 7-in., 9¾-lb. channels. The bumpers are 4-in., 5¼-lb. channels with the flanges turned out. Platform braces are 2-in. x ⅝-in. x ¼-in. channels, riveted under the cross members and tied to the 4-in., 5¼-lb. channel end sill with gusset plates. The main body cross sills are 4-in., 5¼-lb. channels and the intermediate cross sills are 3-in., 4-lb. channels.

The letterboards are formed of No. 18 gage steel and are flanged over the tops of the side posts to produce a horizontal stiffening member at this point and also a substantial support for the top plate and carlines.

Steel carlines of 1¼-in. x ¼-in. bar steel are set on edge over each side post. An ash strip is bolted to each of these carlines and intermediate ash carlines of lighter section are provided between the side posts. The body roof is made of ¼-in., three-ply poplar "Haskelite," scarfed and glued across the car at the center to form a continuous panel. The vestibule hoods are made of tongue and grooved 3/16-in. poplar sheeting butt jointed to the body roof. The header carline under the joint is rabbeted to allow the roof to come flush. The headlining is ⅛-in., two-ply "Haskelite."

Two ½-in. thicknesses of floor are used. The lower is of fir and the upper of maple, separated by tarred felt. Aisle floor strips are formed by rabbeting the floor boards instead of using separate strips.

The body headers are paneled with 3/16-in., three-ply "Haskelite," with gum toward the interior of the car and poplar on the vestibule side. The body side lining is made of 3/16-in., three-ply "Haskelite."

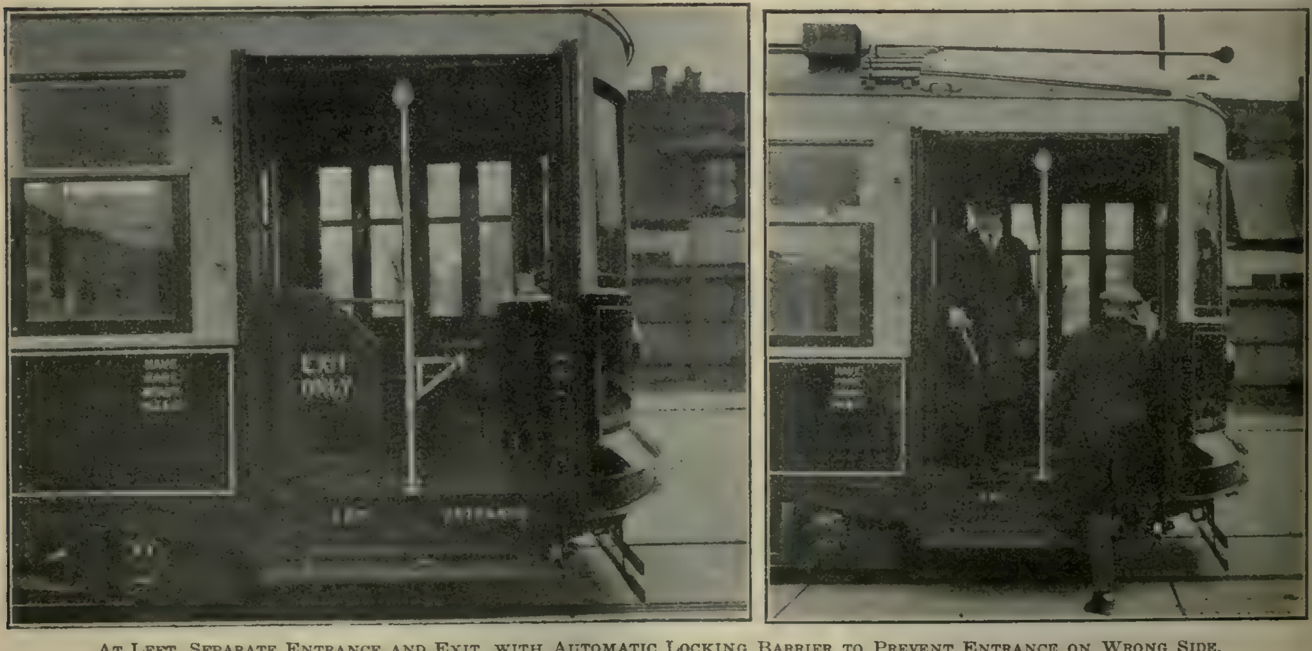
The upper sash are continuous, ⅝ in. thick, and are fastened to the side posts with ¼-in. stove bolts. Brass washers and nuts are used on the outside to facilitate ready removal for repairs. The lower sash are of wood arranged to raise and are provided with brass channel wearing strips on each stile. The window guards are constructed of brass tubing in two sections per side, arranged so that they can be readily removed or swung down below the glass line. The body side curtain rolls are exposed on the interior of the car, the fittings at each post being covered by a small formed cap of brass. The platform railings and stanchions are made of 1-in. and 1¼-in. aluminum tubing. Electric heaters of the truss plank type are used with a thermostat regulator. The Safety Car Devices Company air equipment is installed complete. The pneumatic door engines are carried over the header.

The car is carried on a Brill 79-E1 truck of 8-ft. wheel base, designed to give the low floor height obtained. The wheels are 26-in. diameter with A.E.R.A. standard E-1 axles. Two General Electric 264 motors are used and K-63 controllers.

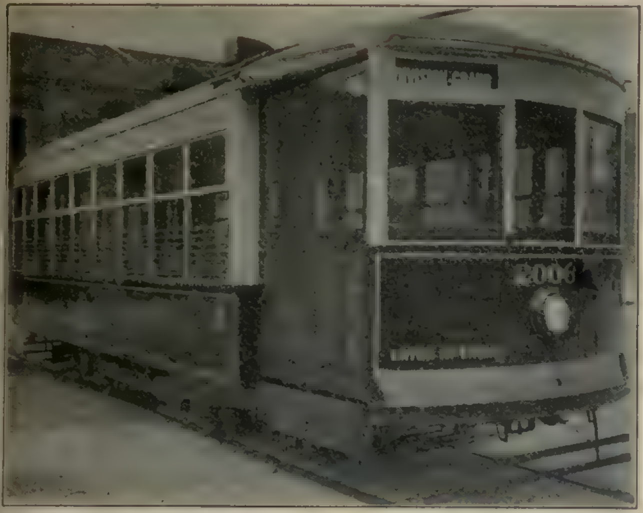
DOUBLE-TRUCK CAR CONSTRUCTION FEATURES

In planning the construction of one-man cars, it was felt that increased comfort to passengers, improved riding qualities and better facilities for avoiding congestion could be obtained in a double-truck than in a single-truck car. It is also apparent that a double-truck car will fit a wider range of operating conditions in a large city. Hence it was decided to build a double-end, double-door, double-truck, one-man safety car for experimental purposes.

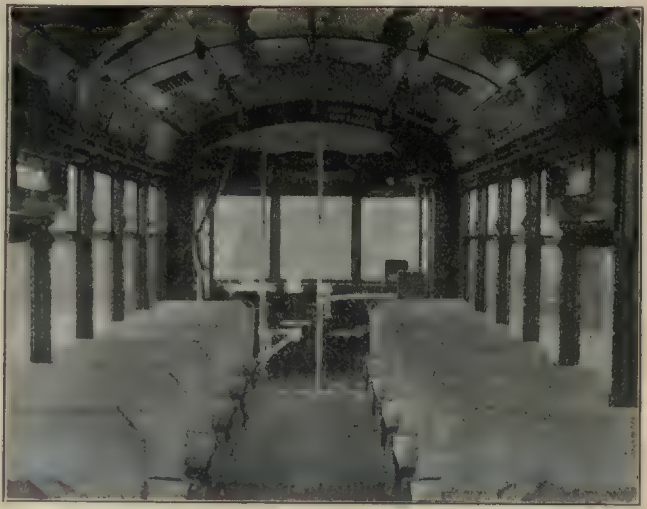
The sample double-truck safety car was built along



AT LEFT, SEPARATE ENTRANCE AND EXIT, WITH AUTOMATIC LOCKING BARRIER TO PREVENT ENTRANCE ON WRONG SIDE.
AT RIGHT, DEMONSTRATING DOUBLE PASSAGEWAY AND LOW BARRIER AS RELEASED FOR EXIT AS PASSENGER STEPS ON TREADLE ON PLATFORM



Chicago Sample Single-Truck, Double-Door, One-Man Safety Car



General Interior Appearance of Double-Truck Safety Car. Note Wide Aisle

the same general lines as the single-truck safety car. The post centers were made 29½ in., as compared with 28½-in. on the single-truck car. The width was increased from 8 ft. over the girders to 8 ft. 4⅜ in. over the girders, or 8 ft. 6 in. over the drip rails. The aisle width was made 28⅞ in. over the end plates of the seats. This wide aisle is considered very essential, as it enables and encourages free movement of passengers to the rear end of the car and eliminates a great deal of congestion at the front end. Experience with the car in service has demonstrated that the passenger load is handled with greater ease and less confusion and crowding than is the case with the single-truck cars having narrow aisles.

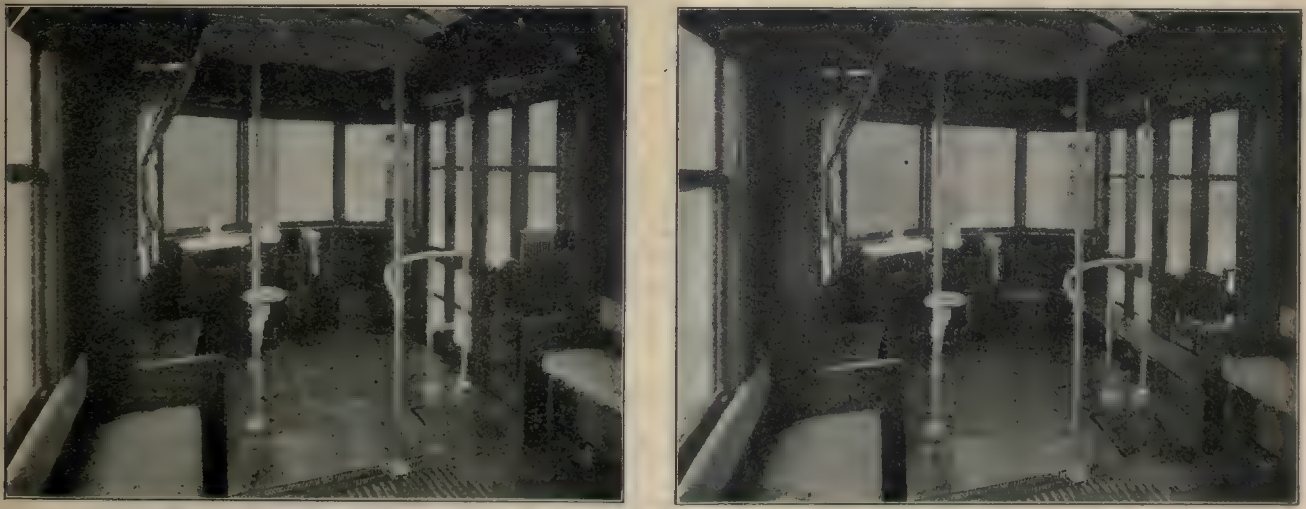
Careful consideration was given to the question of extending the body floor continuously over the platform without dropping the latter. This construction was abandoned, however, due to the desire to obtain a minimum step height from the pavement to the platform to facilitate rapid loading and at the same time obtain sufficient clearance under the floor for the proper installation of the apparatus of a double-truck car of the short truck centers adopted. The platform was dropped 6 in. below the body floor, resulting in step heights of 13 in. and 12 in., respectively, from rail to platform to floor. The end sills were offset 1⅝ in. to provide truck clearance.

The proper length for a car of this type is difficult to determine and depends to a large extent upon local conditions. The use of an additional window section 29½ in. in length would have resulted in greater clearances and a better distribution of apparatus under the car. Whether the addition of one or even two more window sections to a car of this type would prohibitively increase the length is a question to be determined by experience in actual service. In making a comparison of weight between this car and other designs in use, it must be borne in mind that the addition of several window sections would result in correspondingly increased seating capacity with comparatively small increase in weight, thus greatly decreasing the weight per seat.

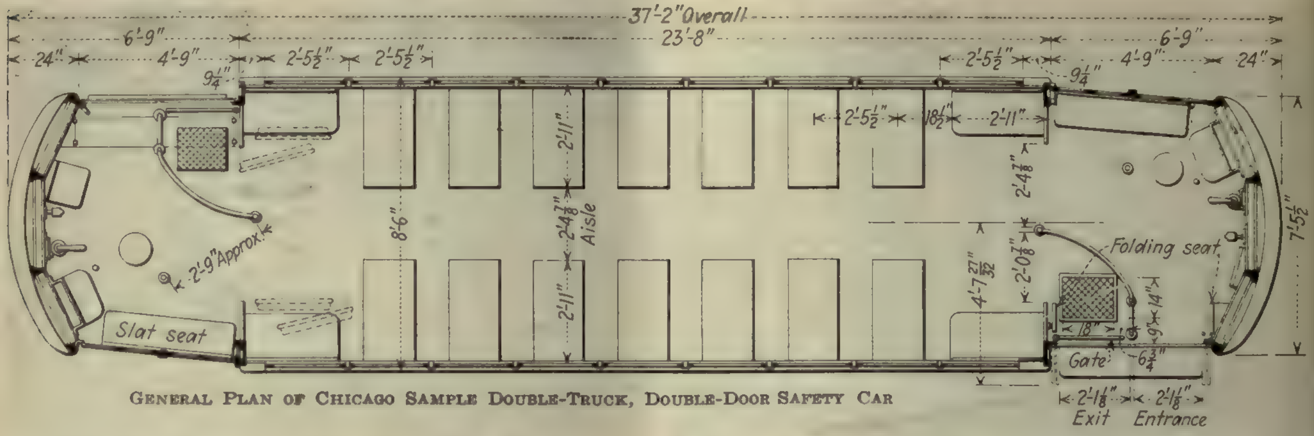
The general dimensions for the double truck safety car are as follows:

Length over bumpers	37 ft. 2 in.
Length over corner posts	23 ft. 8 in.
Width over side girders	8 ft. 4⅜ in.
Seating capacity	45
Width of aisle	28⅞ in.
Entrance and exit passageway widths	25⅛ in.
Height rail over trolley boards	10 ft. 11½ in.
Height rail to top of floor	31 in.
Height bottom of side girder over top of side post	7 ft. 1¼ in.
Side post centers	29½ in.
Truck centers	15 ft. 6 in.

The design of side posts and side girder construction is the same as that used for the single-truck car, with



Front and Rear Platforms of Double-Truck Safety Car Showing Seat Arrangements, Exit Barrier and Treadle, Aluminum Stanchions, Etc.

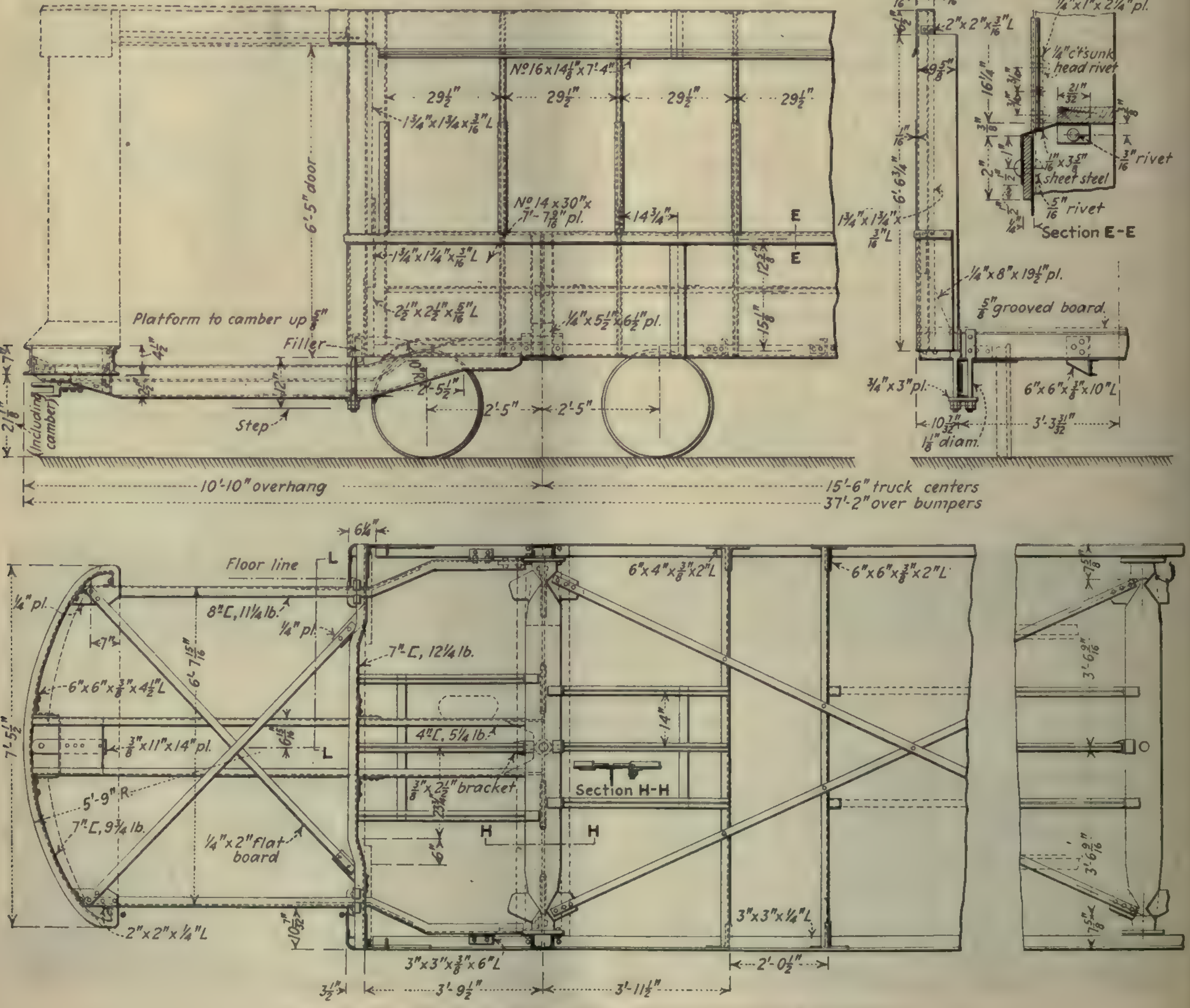


GENERAL PLAN OF CHICAGO SAMPLE DOUBLE-TRUCK, DOUBLE-DOOR SAFETY CAR

the exception that No. 14 gage sheet steel was used for the girder plate and that the letter-boards are made of No. 16 gage steel. Provision is also made for the use of storm sash over the lower sash.

CONSTRUCTION FEATURES OF DOUBLE-TRUCK CAR

The roof construction is very similar to that used on the single-truck car, with the exception that the three-ply "Haskelite" roofing was made in three sections butt jointed and fastened at the carlines. As in the single-truck car, the vestibule hoods were made of tongued and grooved poplar sheeting, while $\frac{3}{16}$-in., three-ply "Haskelite" was used for the headlining. The platform knees are 8-in., 11¼-lb. channels and the bumpers are 7-in., 9¾-lb. channels with the flanges turned out. Two 4-in., 5¼-lb. channel center knees were put in extending continuously from the bolster to the bumper. The resulting structure gives a very rigid stiff platform. Two thicknesses of ⅜-in. flooring were used, the lower of fir and the upper of maple. The



STEEL FRAME CONSTRUCTION OF DOUBLE-TRUCK CHICAGO SAFETY CAR

WEIGHT ANALYSIS OF SINGLE AND DOUBLE TRUCK ONE-MAN SAFETY CARS, CHICAGO SURFACE LINES

	Single Truck		Double Truck	
Steel frame including posts and letterboard		1930		4600
Car Body Structure				
Floor sills and flooring				
Floor sills				
Bottom floor (fir)				
Floor paper				
Top floor (maple)				
Trap doors, etc.				
Crown piece	775		1,255	
Body Framing				
Side post fillers				
Vestibule posts				
Body and vestibule top plates				
Foot rail				
Vestibule ribs				
Curtain rails and blocks				
Truss plank				
Arm rest				
Top sash frame				
Vestibule sash and dash rails				
Upper dash metal (No. 18 gage steel)	450		559	
Exterior Finish				
Lower dash meal (No. 16 gage steel)				
Exterior moldings, etc.	163		178	
Body header structure, including woodwork at corner posts	87		162	
Roof Structure				
Steel body and vestibule carlines				
Wood body and vestibule carlines				
Rails and blocking				
Body roofing				
Vestibule roofing				
Roof canvas and molding				
Trolley boards and cleats	525		805	
Doors and Sash				
Entrance and exit folding doors and barrier				
Vestibule partitions				
Door track, brackets, shafts, steps, operating mechanism				
Body lower sash, locks, etc.				
Glass for doors and sash, including upper sash				
Door engines, covers, pans				
Floors and step treads	1,117		1,452	
Interior Finish				
Dash interior finish and facing, including wiring box and engine housings				
Headlining and moldings, including advertising molding				
Pilasters, parting strips and sash racks				
Body inside lining	320	3437	350	4761
Car Apparatus and Fittings				
Seats				
Body cross seats				
Longitudinal and folding seats	709		900	
Railings, stanchions and grab handles including motorman's seat	102		147	
Destination and route sign boxes, curtains, mechanisms, etc.	32		92	
Car and motorman's curtains	75		75	
Window guards	82		82	
Ventilating equipment	49		89	
Drawbar	20		25	
Fare register and mechanism	77		98	
Life guards and splash guards for apparatus	207		285	
Auxiliary Electrical Apparatus				
Heaters and thermostat				
Buzzers				
Lights and switches, compressor fuse, etc.				
Headlight	178		248	
Auxiliary wiring and conduit	68		98	
Miscellaneous				
Trolley catchers				
Gongs				
Motorman's climbing steps				
Handstraps	63	1662	63	2202
Electrical Equipment				
Motors, pinions and gear cases	1915		3,864	
Motor wiring and conduit	105		175	
Controllers and resistance	477		892	
Trolley, lightning arrester, fuse box, choke coils, etc.	305	2802	264	5195
Brake Equipment				
Compressor, reservoirs, governor, hangers and strainers	665		953	
Air piping, valves and fittings	574		324	
Brake cylinder and foundation rigging	191		356	
Hand brake and rigging	94		139	
Sand boxes and traps	59	1583	59	1831
Trucks				
Trucks framing, bolsters springs, transoms, etc	2,780		4,658	
Axles, wheels, gears	1,913		4,148	
Truck guards		4693	150	8956
Paint and varnish		110		225
Miscellaneous bolts, screws, etc.		158		280
Total weight		16,375		28,050

construction of aisle strips is the same as for the single-truck car.

The full Safety Car Devices Company equipment was installed. With the co-operation of the manufacturers the door engines were obtained in aluminum. Aluminum railings and stanchions were used throughout. This material was also used for the heater conduit carried along the truss plank on the interior of the car, and for all air piping and fittings. Care was taken in installing aluminum pipe with iron apparatus thoroughly to coat the joint with heavy insulating varnish to prevent any tendency toward galvanic action. The total saving in weight resulting from the use of aluminum was 450 lb. Cross-seat heaters of a special light weight design manufactured under the company's specifications and saving 125 lb. per car were used. These were made up in three-coil, 400-watt units for the body heaters and six-coil, 800-watt units for the two platform heaters, all coils being interchangeable.

The trucks are of the Brill 77-E1 type, 5-ft. 10-in. wheel base with 26-in. diameter wheels and A.E.R.A. standard E-2 axle. They are specially designed for this weight of car. Four Westinghouse 508 motors, inside hung, are used with K-35 control. The car is equipped with a line switch carried under the floor, instead of the ordinary circuit breakers, and the platform controllers are provided with ratchet switches for the operation of the line switches. A new type of air tripping mechanism was installed in the line switch, to operate with the safety equipment. It was considered very desirable to place the current breaking apparatus under the car instead of inside the car body.

The accompanying tabulation gives a detailed weight analysis of both the single and double truck cars.

Interurban Service De Luxe

Sacramento Northern Operates Dining and Observation Car Service Between San Francisco and Chico—184 Miles Covered in About Six Hours

THE Sacramento (Cal.) Northern Railroad recently put in commission a luxuriously furnished dining and observation car, which is being operated over the company's lines from Chico to Sacramento and thence, by special arrangement with the San Francisco & Sacramento Railroad, over the lines of that company direct to San Francisco. Under this arrangement passengers are not required to change cars during the entire 184-mile trip between San Francisco and Chico.

The car makes one round trip daily. Leaving Chico at 6:10 a.m., it arrives on the Oakland Pier at 12 noon; returning, it leaves the pier at 4:55 p.m. and reaches Chico at 11 p.m. On both these runs it is a great convenience to passengers to be able to get meals en route. The new service was started Oct. 24 and after fifteen days of operation had become so popular that since then all observation-car seats have been sold out on each trip. About forty meals per day are being served in the dining room.

The car has an inclosed observation end which seats twenty passengers and there are accommodations for twelve more in a smoking room, or a total of thirty-two seats for which an extra fare is paid. This is in addition to the dining room, which seats twelve. The extra fare is 50 cents for the through trip, thus the seat revenue of the car is $16 per trip when all seats are sold. Passengers holding only ordinary tickets have access to the dining room when meals are being

THE DINING AND OBSERVATION CAR WHICH MAKES A ROUND TRIP DAILY BETWEEN OAKLAND PIER AND CHICO

served, but cannot ride in observation or smoking compartments without extra fare tickets.

The car was owned by H. E. Huntington and was used as his private car when he was president of the Pacific Electric Railway. The idea of refitting it and using it as a dining and observation car was conceived and carried out by J. B. Rowray, general manager of the Sacramento Northern Railroad. The car is 65 ft. long and weighs 96,300 lb. It has a steel frame with wood sheathing and is attractively lined with inlaid mahogany.

The changes necessary to make it suitable for the present service were made in the Sacramento Northern shops at Sacramento. The most important of these was the substitution of the dining room for a suite of bedrooms and the changing of a side door from the rear end to the front. An ample, well-arranged kitchen was part of the original equipment. The crew of the car consists of four men, a steward, a chef and two assistants.

Since this dining car service has become popular with such rapidity other electric railways that operate over long stretches have shown much interest in its operation.

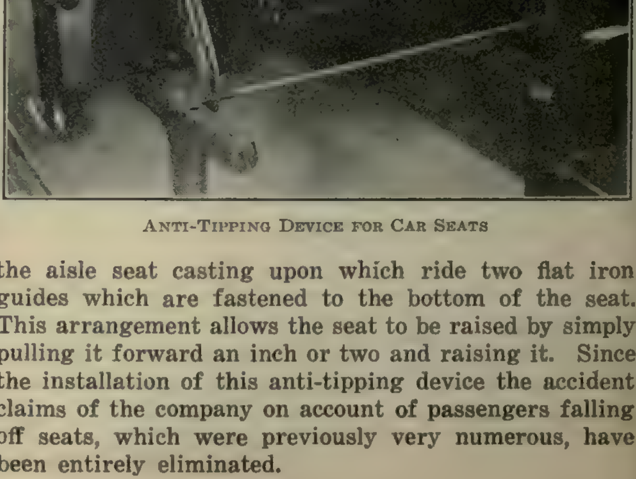
Half Million of Utility Security Holders in Illinois

IN A recent address before the Illinois Independent Telephone Association, John F. Gilchrist, vice-president of the Commonwealth Edison Company, declared that there were at present at least 500,000 holders of utility securities in the State of Illinois, and these with their families constitute almost one-third of the population. While he thought this was a very good showing, he did not consider it enough, and the utility companies should not be satisfied until from 60 to 80 per cent of all the families in the state have within the family circle at least one member who is a security holder of a utility. Utilities, in the opinion of the speaker, possess a number of advantages for this kind of customer ownership.

The following points were listed by Mr. Gilchrist as questions which should be considered by a person considering an investment: (1) What do the physical properties consist of? (2) Can you actually see these properties? (3) What is the financial position of the company? (4) Do you know the character and reputation of the management? (5) Are the products or services supplied absolutely essential to the public? (6) What are the probable future demands for these products? (7) Are the earnings steady or do they fluctuate? (8) Can the business continue under the stress of adverse conditions? These qualifications, he said, are answered by a utility probably better than by any other type of corporate investment.

Anti-Tipping Device for Car Seats

THE accompanying illustration shows a device used by the International Railway at Buffalo, operated by the Mitten Management, Inc., to overcome the tipping of cushions. A ½-in. rod is placed in between the seat casting which fastens to the side of the car and the aisle seat casting upon which ride two flat iron guides which are fastened to the bottom of the seat. This arrangement allows the seat to be raised by simply pulling it forward an inch or two and raising it. Since the installation of this anti-tipping device the accident claims of the company on account of passengers falling off seats, which were previously very numerous, have been entirely eliminated.



ANTI-TIPPING DEVICE FOR CAR SEATS

Insurance for Electric Railways

Safeguards Service by Stabilizing Credit—An Efficient Aid in Handling Labor—Affords Opportunity for Operating Economies—Suggestions for Executive Action—Summary of Types and Classes Available for Street Railways

THE intelligent consideration of the insurance needed for any electric railway property and organization involves first a study of the whole system in order to determine just what types and amounts of insurance are necessary, are economical and are useful considering all property, financial, operating and labor conditions.

The next step involves placing the insurance and securing terms. This necessitates a knowledge of the reputable insurance companies, a study of policy clauses and their modification to suit the local situation, a legal consideration of the contractual features of the policy and finally a consideration of the rate for each policy. The rate involves the cost element and necessitates a knowledge of insurance, of methods for securing rate reductions and of methods for obtaining and making insurance classifications.

The final step in insurance is a consideration of the method for maintaining insurance inspection and for instituting and operating the so-called welfare types of insurance. This final step is one of the most important, as insurance policies are not courtplasters to paste on an industrial body in any location. The specific wounds must be found and given first aid before the policy will cure the trouble.

There are many types of insurance applicable to railway organizations. The principal ones are:

1. Fire insurance.
2. Compensation insurance.
3. Group life, accident and health insurance and old age pensions.
4. Public liability insurance.
5. Property damage and collision insurance.
6. Use and occupancy insurance.
7. Fidelity insurance.
8. Burglary insurance.
9. Catastrophe insurance.
10. Boiler and flywheel insurance.

Each of these types is subject to many classes of policies as applied to buildings, street cars, automobiles, power houses, employees and the public, and the specific railway property and local conditions fix or determine the exact rates and details of the policies. Insurance is a financial protection and, other things being equal, the railway property wants protection at minimum cost and should base the amount of its insurance on financial considerations. The exception is welfare insurance, one of whose functions is to increase the morale of employees. In this type of insurance the value and the protection are intangible elements that involve many factors associated with public relations and labor relations.

FIRE INSURANCE PERMITS ECONOMIES

Fire hazard in the electric railway industry arises in the shops and carhouses to the greatest extent because of the combination of risks introduced by the presence of cars, paint, oil, wood, varnish, waste, etc., in conjunction with grounded electric circuits. The best preventive of fires and the lowest insurance rates will result when a general policy is followed of building isolated structures of fire-resisting nature with compartments for the isolation of all inflammable and explosive material, combined with clean premises maintained by constant inspection and supervision. In existing structures, however, rates can often be reduced by adequate and inexpensive changes which lower the hazard. There are many instances where a few improvements to decrease fire hazards resulted in a saving for the first year that paid for the cost of the improvements. Such was the case on the East St. Louis & Suburban Railway, where the company co-operated with the Electrical Inspection Bureau, made a few changes in structures and methods and reduced the rate from 62.88 to 39.2 cents per $100 of policy. The dollars thus saved were used to add to the amount of the policy (see ELECTRIC RAILWAY JOURNAL, Feb. 26, 1921, page 397).

Fire insurance may be carried by any one of three methods. A railway organization can carry its own insurance or it can join an association of railway or other companies organized for mutual insurance purposes, or it can take out policies with one or more stock fire insurance companies. The size of the property and the maximum fire risk on it have an important bearing on the decision.

A large company with properties so scattered as to have a relatively small aggregate risk in any one location can often afford to assume a certain portion of its risk, while a smaller property could not venture to do so because of the financial effect of the same risk in case of loss. Then again advantages may be offered by an excess type of fire insurance policy whereby the insurance company pays a loss when it exceeds a stated sum, say $100,000, then on up to another, say $300,000.

In 1910 the Philadelphia Rapid Transit Company carried $18,500,000 of fire insurance at a rate of 50 cents per $100. By means of improvements and better inspection the rate was reduced to 25 cents per $100 in 1919. During the period from 1911 to 1918 the company paid over $600,000 in insurance premiums and received in return less than $60,000 for fire losses. On this account the company decided on Dec. 31, 1918, to carry and assume 33 per cent of its own risk, after having made a survey of its property which fixed the greatest possible loss from any one fire at $250,000.

INSPECTION AND RATES

Commercial insurance organizations have agreed upon certain rates for certain standardized classes of fire insurance risks, the rates varying according to the condition of the properties in each one of these classes. The insurance organizations have also established inspection bureaus, to assist them in the intelligent setting of a rate on any specific building in any specific property. Insurance companies, to summarize, have a co-ordinated organization for handling fire insurance. The general method of procedure is for the inspectors of the insurance company to inspect each risk or each property, divide it into separate classes, fix the rate for each class determined by the rules and regulations of insurance as agreed upon by underwriters and thus build up a sum total of insurance which is prorated among several companies or handled by one company depending upon conditions.

In certain kinds of fire insurance the inspection service, as such, is a most valuable portion of the insurance covered by the policy. Electric railways and many other insured organizations, as a rule, have comparatively little intimate knowledge of fire insurance, particularly with respect to how rate classifications are made up and how changes on their property can secure them reduced rates. Inspectors of the insurance company make a rate classification as fixed by the situation when the policy was granted and have no incentive but competition to make constructive suggestions whereby reduced rates can be secured.

In most cases an allowance of 10 per cent in the insurance rate is made by rating associations from the 80 per cent co-insurance clause rate for the substitution of the 100 per cent clause. A blanket insurance policy usually requires a 90 per cent or 100 per cent clause. On properties liable to fluctuate in value, the lower percentage of co-insurance is highly desirable to take care of increases that may occur in the value of the property.

Fire insurance as a commercial business does not pay exorbitant returns on the volume of business done. For example, the results of ten years' operations of ninety-four large fire insurance companies show a net profit of only 2.81 per cent on a total business of over $3,700,000,000. These companies paid out for losses 49.36 per cent of their collections during the decade ending Jan. 1, 1921. Operating expenses were 37.78 per cent and increased liabilities amounted to 10.05 per cent. These same companies in 1906, on account of the San Francisco fire, paid out $15,000,000 more than the profit derived from all underwritings obtained in the last decade. The direct return on the volume of business, therefore, in fire insurance is not great, and the insurance companies derive their profit largely from the interest on their reserves, which are essential to the financial integrity of each company. The return based on the capital invested in these ninety-four companies was not stated in the statistical report from which the above figures were obtained.

WELFARE INSURANCE SHOULD BE CO-OPERATIVE

There are certain classes of insurance which are intimately associated with the personnel of a street railway organization. Group accident and health insurance, group life insurance, and old age pension schemes are examples of this type of insurance. All of these classes are handled by insurance companies with the exception of old age pension schemes, which must function as a part of the financial and labor system of the railway property.

The types of insurance, however, that require the most study from the manager are group health and accident and group life insurance. These are intimately tied up with public relations, labor relations and operating conditions. No standardized treatment can be followed, since every railway company has a different personnel and operates under different conditions.

The best practice in connection with such insurance is for the company to make a detailed study of the organization and of operating conditions and then get the employees themselves interested in the plan. If the heads of the various departments are called together and the insurance plan is made clear to them and also the fact that they themselves will pay a portion of the insurance cost or dues, then these men through asking and answering questions help to formulate an insurance of the type suited to the local conditions. These same executives of departments going out among the men are competent to answer all questions arising in connection with the insurance, and the whole operating organization, including the wives of the employees, must be permeated with an understanding of the type of insurance, why it is carried, how much it costs and who is bearing the cost, until it becomes popularized and is "sold" to the whole operating force and their families. When this procedure is followed, success generally attends the inauguration of this type of insurance.

Often the insurance company may afford expert advice and assistance in connection with welfare work for the personnel of the companies who are insured by them, but, if furnished, this type of insurance is successful only when the employees as a whole understand and approve the whole plan. Otherwise it may be received with suspicion and produce an antagonistic attitude which often follows paternalism in management.

Group insurance and pension plans can be handled in many ways. Some form of co-operative scheme between employee, employer and the commercial insurance company is the general practice in the railway industry. Group insurance of this type is usually divided into two classes. The first comprises group accident and health insurance. This is usually a co-operative type of insurance developed by the employer and employee in conjunction and depends for its success on the coordinated efforts of the two parties to the contract. All features of such an insurance project should be discussed and worked out by a committee made up of representatives of employers and employees. The first thing to do is to decide on the plan and the amount of participation and then appoint a working committee among the employees to draft the final plan and send out a circular giving all details. The first provision in this type of insurance usually covers not only injuries resulting from employment, which are already covered by state compensation laws, but also any other injury that may occur to the employee and sickness of every kind and nature.

A typical form of group health and accident insurance would have clauses specifying the period covered, say twenty-six weeks or fifty-two weeks or longer, and providing indemnity for all injuries not included under workmen's compensation act and for all sickness at a definite sum per week, say $5, or for a definite percentage of the payroll, say one-half or one-fourth of the average compensation of the employee. A group insurance contract of this kind, as issued by the insurance company, will usually specify the number of employees or give their names and will state the amount covered in the insuring provision for each employee. The employee will then receive from his employer an individual policy for his coverage under the contract, and the employer settles all claims through his own claim organization. To cover the cost it is quite common to have an arrangement whereby a percentage of each employee's salary is paid into an insurance fund and another percentage is paid into the fund by the employer. The cost of such a benefit policy, based on two-thirds compensation as obtained from a large insurance company for fifty-two weeks sickness period, will vary, according to conditions of employment, from 1 to 1½ per cent of the payroll.

Group life insurance is usually a contract taken with an insurance company to cover a certain number or names of employees and contains the amount of insurance for each employee and the insuring provisions. The provisions usually include immediate payment of the full amount of the policy in the event of death and installment payments to the amount of the policy in the event the employee becomes totally and permanently disabled from accident or disease, prior to reaching the age of sixty. The employees may or may not pay a portion of the premium on such a group policy, depending on the internal character of the organization. Some policies are written so as to enable an employee leaving the company to convert his individual group life policy to a straight life insurance policy at a very favorable rate.

The indemnity arrangements are very different for the different organizations. In some cases, in case of death, there is a flat indemnity of $1,000 for each employee. In other cases the indemnity is in force only after an employee has been with an organization for one year. In still other cases the indemnity clauses read that $500 will be paid for each year of service until a maximum sum, say $2,000 per employee, is reached. Again, the indemnity may be based on the salary received by the employee for one or two years previous to death. The rate is usually based on the combined ages of all employees dealt with on a rated base and not on an average base. It will be from $8 to $12 per $1,000 indemnity.

The primary advantage of group life insurance to the employer is that it furnishes an incentive to the employee to remain at work with the one organization for a long period of years, and the best type of group life policy takes this feature into consideration by giving a bonus increase of indemnity per year of service. Such a clause has many advantages. It increases the sense of financial independence to the employee, reduces the cost of labor turnover, gives a solution of the transient labor problem, introduces better shop morale, provides a better class of employees and adds a certain publicity and philanthropic value to the company's name.

PENSIONS COMBINED WITH LIFE POLICIES

Old age pension schemes are very good to co-ordinate and hold up the morale of an organization, but they must be sound from an actuarial standpoint and they must be co-operative and not paternalistic. The cost is such that few commercial insurance companies are in the business, and most of the schemes are carried by the individual railway organizations. The individual case often requires some deviation from the fixed rules, and the co-operative company-employee plan permits of such treatment. The employee should pay for his share of the cost and should really function to operate the plan. A sense of freedom from the financial worries associated with old age and a feeling of partnership in the affairs of the company result from a properly instituted and operated pension plan.

The cost of such schemes can be computed on different bases:

1. An endowment plan or the payment of the entire reserve as insurance in the event of death and the return of the accumulated reserve before reaching the pensioning age.
2. A plan that provides for the return of the premium and accumulated interest in the event of death or retirement.
3. A plan that provides for no return of premiums in the event of death before the pensioning age is reached but with a provision for their return with interest in case the employee leaves the service.

The cost is the deciding factor, and often the clauses of the group life policy used in conjunction with the pension plan will affect the cost and clauses of the pension plan. The financial aspect varies with the policy, but those policies which have proved most satisfactory provide for a minimum flat payment of so much per month with an adjustment based on salary and years of service. The employee contributes on a monthly basis a fixed sum which is most conveniently handled when it is subtracted from the monthly payrolls. At least four classifications of employees based on salary or wage earnings can usually be made to advantage in most railway pension systems. The pension type of insurance is the most intricate and delicate to administer from a financial and psychological standpoint, yet it offers opportunity for the greatest return in increased *esprit de corps* of any type of so-called welfare insurance.

The commercial insurance companies will write group life policies, but, ordinarily, pension schemes are handled on a participating basis by the employer and the employee in combination with the individual life indemnity. In other cases the employer himself pays the pensions through a reserve fund. The general provisions of a pension plan, worked out by the employer and employee, usually provide that pension shall begin at a certain age, say sixty or sixty-five years, and after twenty to twenty-five years of service the amount of the pension shall be from $100 per year up, with provision for a certain number of payments in the event of death before receiving the specified number of payments. At the same time life insurance begins at, say $500, and increases to a certain figure of, say, $2,000, at the age of sixty-five years. Provisions usually are made for agreed non-forfeiture cash loan and paid-up value for every year the policy is in operation after the first. Another clause in the life policy usually provides for waiver of payment by employer and employee if the insured is totally disabled before reaching sixty-five or some other stated age.

BENEFIT ASSOCIATIONS HANDLE INSURANCE

Benefit associations usually function as an employee and employer organization which can care for group accident and health insurance, group life insurance and old age pensions. Each employee pays a certain amount as dues to the association and the employer pays a certain amount, as a rule, and the dues and funds thus obtained are used not only to pay for the insurance carried with insurance companies, but also to take care of welfare work and old age pensions suited to the needs of the specific organization.

In the railway industry the latest data indicate that about thirty companies have old age pension schemes, while 125 companies have some form of benefit association which pays sickness, accident and death benefits.

COMPENSATION LAWS

The subject of insurance to cover workmen's compensation law requirements is very complicated and is made more so by the differences in the state laws.

Nearly every law is based on the old English clause "Personal injury by accident arising out of and in the course of employment," but many of the laws leave out certain of these words, such as "out of and" or "and in the course of" and the courts themselves have not clearly defined and distinguished the meanings of such phrases as "occupational disease," "accidents" and "injuries."

The local law must be complied with by each railway property and but little chance is available for economies other than the use of "safety first" methods. It would seem reasonable, however, to get better and more uniform laws through study and exact data. How much compensation in excess of the law requirements should be carried in the way of life insurance, or additional accident and health insurance, if any, is a matter for each organization to determine.

FIDELITY BONDS

The use of fidelity bonds is necessary when laws require bonds from certain employees, or when the company itself wishes protection against losses caused by the dishonesty of employees. Rates for this type of insurance are fixed by the aggregate amount for each company. It is possible in this type of policy to bond each employee for a fixed sum as is usual and then to take out an extra coverage of, say, $100,000 to $250,000, which would apply to each loss caused by the dishonesty of any one of the bonded employees. This excess coverage method is claimed to make possible a small bond per employee, to secure a lower cost of insurance and to obviate the objection of bonds covering the individual employee in that, in such a case, any one loss may be and often is greater that the amount of the specific bond.

CATASTROPHE INSURANCE NEW

Catastrophe insurance is of recent date and is an outgrowth of the older type of insurance called common carrier insurance. It protects the assured against any excessive property damage or public liability arising from the operation of passenger cars owned, leased or operated by the railway companies. The older type insurance, called common carrier insurance, attempted to cover all claims arising from this type of catastrophe, but was not very successful. One reason for this was that a third party was introduced between the manager of the system and the public in the settlement of claims. Many petty claims involve questions of policy which are best handled by the railway organizations. Also, since it is best to settle a claim as quickly as possible, the insurance companies may cause a delay in such settlement as usually they lack the organization necessary for making such settlements.

A different condition of affairs exists in the street railway and motor bus industry than on the steam railroads as regards catastrophe insurance. On the steam railroad a serious accident is usually a collision or derailment of a passenger train which is composed of several coaches filled with passengers, and the resulting aggregate claims often amount to an immense sum. In the street railway industry the collision of two street cars would involve equipment and passengers in an aggregate sum about equal to that involved in the wreckage of one passenger coach on a steam railroad. In the event of catastrophe to a motor bus still less aggregate sums would be involved, since the passenger-carrying capacity and the investment in the vehicle is comparatively small. These features, together with the decreased liability hazard caused by slower speed and safer operating conditions, as indicated by statistics, would seem to point toward catastrophe insurance or public liability insurance as a type of insurance that could be carried by the street railways and the motor bus companies.

The new type of public liability policy for catastrophe is based on losses within certain limits. A typical form would read that the assured shall be protected under the policy only for a loss which is in excess of $25,000 for any one accident and then is protected up to a loss for that accident of $100,000, it being understood, however, that there is no limit to the number of accidents of this kind for which claims may be made during the existence of the policy. The premium paid varies with the limits set and other features.

The procedure under this policy after an accident is about as follows: The railway company begins immediately with settlements, and at the earliest possible moment advises the representatives of the insurance company of the accident and the adjustments so far made and discusses with the representative in regard to further settlements or legal proceedings. If the attorneys of the insurance company elect to litigate for claims in excess of $25,000, then they consent to bear all the law costs in connection with the litigation to a value equal to the total liability of the assured.

The premium payable for this type of policy is calculated at a rate of, say, $1 per thousand dollars of gross passenger revenue received by the railway company during the time of the policy, plus an addition of 25 per cent of the sum so calculated for the proportion of single tracks (excluding yard, carhouse and dead trackage) to the total mileage of the railway company track. The railway company agrees to pay a minimum first premium calculated at a rate of, say, $10 per passenger car in operation, and should the total premium thus calculated be less than the premium figured on the basis of gross passenger revenue, then the railway company pays a further premium equal to the excess. If the number of passenger cars is increased during the existence of the policy, the premium payment is proportionally increased and prorated over the period the cars are operated.

As an example of the application of such a policy, assume a railway company has eighty cars. At $10 per car the minimum first premium would be $800, payable at the time the policy is taken out. Assume that the gross receipts of this railway company for the ensuing year amount to $1,000,000, then at $1 per thousand the premium would be $1,000. If the total track is 100 miles, of which 30 miles is single track, then 30 per cent of the total trackage is considered as single track. Twenty-five per cent of the premium, $1,000, is $250, and 30 per cent of this amounts to $75. Therefore, the total premium on the adjustment basis at the expiration of the year amounts to $1,075. As the first minimum premium amounted to $800, the difference between $1,075 and $800, or $275, would be paid to the insurance company at the end of the year's operation.

This type of insurance is particularly applicable to small railway property where any one catastrophe might send it into the hands of a receiver. The very large companies set aside a contingent fund for the same purpose, based on a percentage of gross receipts. Most of them carry their own excess damage and public liability insurance, since the aggregate sum involved in any collision of two passenger cars would be comparatively small for the large company, even though many instances show that a collision of two cars may result in a liability settlement of over $300,000. On the small railway insurance against such a loss is often necessary to protect the stockholders. Their equity, however, is usually so large that the bondholders are reasonably well protected against any such unforeseen circumstances or disasters.

A unique application of catastrophe insurance is the policy taken out in Cleveland during a strike situation. The Cleveland Railway in 1919 took out a "strife and civil commotion" policy for $10,110,000. The premium on this policy amounted to $37,100.

Discrimination Against Railways

A very annoying condition exists in regard to the accident insurance laws for travelers on street railways. The by-laws of many accident insurance companies and mutual accident liability associations provide for the payment of double the normal benefit to policy holders from accidents occurring when traveling on steam railroads. This discriminates against the traveler on electric roads, yet accident statistics show that about four accidents occur on steam roads to one on electric roads per thousand of passengers carried. In the opinion of many electric railway managers this clause should be changed, and the railway industry should exert sufficient pressure backed by data to overcome the inertia, largely historical, of the insurance companies in regard to the subject.

Another condition exists in some states, such as New Jersey and New York, which is detrimental to the street railways. In those states the courts will not allow the fact brought out if an insurance company has paid a benefit to the citizen bringing suit against the street railway company. The practice of railways differ also when settling accident claims of those who have and have not commercial accident insurance policies.

Use and Occupancy Insurance

An insurance company will now guarantee the service of a street railway. Fire, water, boiler explosions, turbine failures or any other catastrophe can be insured against by a type of insurance called "use and occupancy." It originated during the war where the production or the fixed charges of commercial factories were insured against breakdown. It provides in those cases for a daily indemnity paid the assured, based on the daily earning capacity of the plant. Usually a time interval of from twenty-four hours to eight days elapsed before the indemnity payments started. This insurance has developed until now service can be insured in any public utility enterprise. The rates for this kind of insurance depend largely on the arrangements for standby or reserve equipment or personnel. A 15,000-kw. turbo generator can carry a use and occupancy policy for about $3,500 to $4,000 per year, but a service guarantee on a street railway system would have a premium fixed by the local conditions.

This type of insurance is very new and may advance to the stage where a service guarantee can be carried on every motor in every street car. Use and occupancy policies are over and above all fire and accident policies already carried and involve continuity of service only.

Motor Bus Insurance

The use of the motor bus by railway operators brings into operation some new types of insurance. Fire and theft insurance at present costs $40 to $50 per bus per year. Collision insurance, which cares for damage only to the railway motor buses and not for damage to public vehicles, is written in several ways. For example, on a fourteen-seat motor bus collision insurance would cost about $340 per year. If the policy is written so that the insurance company is exempt from payments on each collision whose cost for damages is less than $50 the cost is only $102 per year. If the exemption of the insurance company is $100 per collision per bus the cost is $52 per year. The judgment of the railway executives and the specific local conditions dictate the amount of exemption warranted if any.

Property damage and public liability insurance for automobiles is very similar to older types of common carrier insurance used on railroads. It is a new development and varies in its clauses. Rates in motor bus insurance vary with the district in which the buses are operated and other conditions, but, on the average, an insurance policy which provides for $5,000 maximum for an injury to one passenger per bus and $10,000 for injuries to more than one passenger per bus might have a cost scale based on the seating capacity as follows:

Not over twelve passengers	$375 per bus per year
Not over thirteen to twenty passengers	445 per bus per year
Not over twenty-one to thirty-one passengers	570 per bus per year
Over thirty-one passengers	765 per bus per year

Some of these policies contain maximum limits of $20,000 for public liability clauses. On a fleet of buses premium credit is given for every consecutive twenty-four hours each bus is out of service during the year.

This type of insurance is more or less experimental and is usually handled by a group of associated stock companies so that each company bears a small portion of any loss that may occur. Whether this type of insurance will continue is a question. The old steam railroad common carrier insurance companies found the business unprofitable even with rates equal to 1½ to 2 per cent of the gross receipts of the carriers. A difference may result because of the type of transportation. In the motor bus each catastrophe would at most involve two buses with passengers, while in steam railroads some catastrophes, as described, would involve many coaches. Also, the liability hazard as indicated by the existing data seems to be much less with the motor bus type of transportation.

In many cases where liability indemnity bonds must be given the amount and the method are fixed by local or state laws. The insurance company writes a policy that fully covers such bond requirements, and these insurance policies are frequently accepted in lieu of bonds by civil authorities. In some cases a liability bond per passenger seat must be filed in each community in which a motor bus operates, *i.e.*, a $500 bond for each town becomes a $2,000 bond to the motor bus owner if he operates in four towns. In some cases of this type certified copies of the insurance policies, with provision for modification of policy expiration, are accepted by the communities in lieu of the bonds.

Conclusions

No attempt has been made to go into the technical details of the various insurance policies available to street railways. A brief outline of the types of insurance now available to the railway industry, combined with methods for handling insurance, may offer opportunity for speculative thought to railway executives regarding their own insurance situation.

Fire insurance offers most opportunity for direct economies in dollars and cents and seems most to lack standardization in methods of handling and in types of policy, but on the other hand it is the type of insurance necessary to all railways.

Social insurance has very good possibilities to enhance the cordial relations between employer and employee, so requisite to the successful operation of a street railway system. These possibilities seem to be realized only slightly in the railway industry and developments are warranted along the lines of welfare insurance. It is a type of insurance, however, which must have the best executive supervision to succeed.

Motor bus insurance should prove of more and more importance in street railway transportation and should become more definite and practical as experience and data are obtained. The new types of insurance may or may not be applicable to the specific railway property, but the excess type of policy, or catastrophe policy, is a logical development in insurance that may afford safeguards to many railway properties. Insurance is not standing still, but is growing in scope and importance and even today is a major subject in the street railway curriculum.

Los Angeles Wholesale Terminal

Rival of Bush Terminal Erected in Los Angeles at Cost of $10,000,000—Served Exclusively by Pacific Electric Railway Company

BY CLIFFORD A. ELLIOTT

Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

IN THE issue of the JOURNAL of July 7, 1917, the proposed plans of the Los Angeles Union Terminal Company's layout were described. Since this date the major portion of the new terminal has been completed and put into operation. This $10,000,000 wholesale terminal is located at Seventh and Central Avenues on the site formerly occupied by the Pacific Electric Railway's main car shops and car houses. These were removed from the site and new shops provided at the townsite of Torrance, while new divisional carhouses and storage tracks were provided at the Macy Street yards.

The new wholesale terminal, as completed, is considered one of the most efficiently equipped and modern plants in the United States, and is the second largest in size, the Bush Terminal being the largest.

The new terminal layout includes a produce section, in which 80 per cent of the wholesale fruit and produce business of Los Angeles is conducted, and a warehouse section which is laid out and equipped for the most economical handling of the business of wholesale, manufacturing and distributing firms.

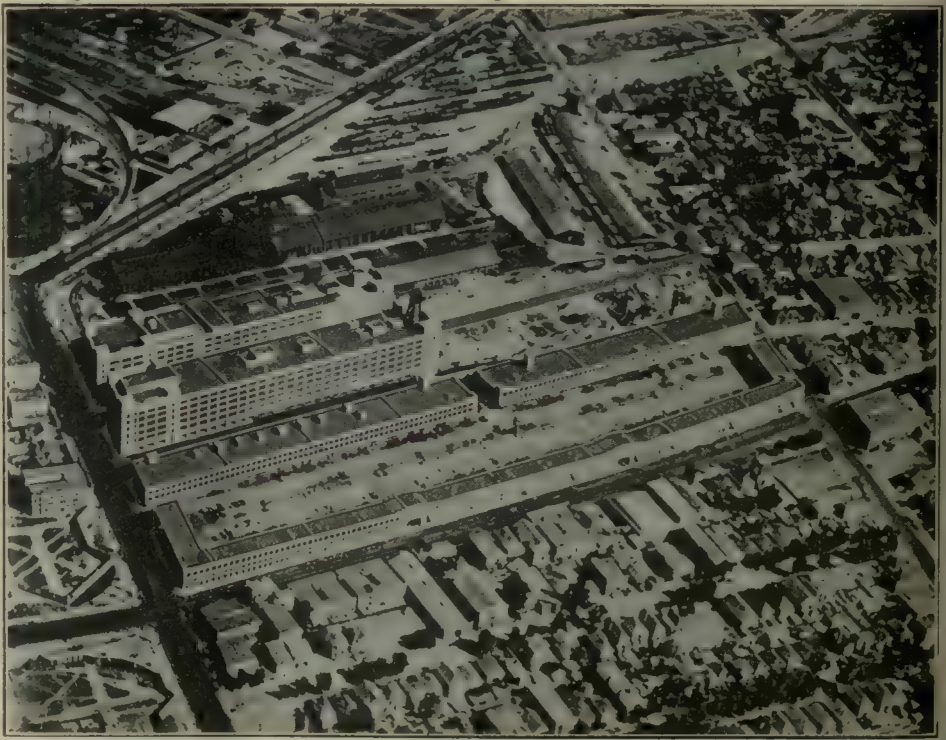
One hundred and seventy-five wholesale and manufacturing firms conduct their entire business in the terminal. For their accommodation there are located in the buildings: A bank, Western Union and Postal Telegraph offices, Standard Oil service station, box factory, 100-suite office building, forty-room hotel, two restaurants, barber shop, cigar stand, printing plant, public cold storage warehouse with 1,000,000 cu.ft. of storage space.

For the accommodation of farmers selling fresh produce and fruits there is provided a market court 1,200 ft. long by 200 ft. wide. In this court there are stalls for 500 teams and trucks.

The terminal buildings consist of three two-story produce market buildings and three seven-story warehouse and manufacturing buildings. These reinforced concrete buildings, if placed end to end, would be more than 1 mile in length and include 1,750,000 sq.ft. of floor area.

Frequent, rapid and noiseless railroad switching service is performed by the electric locomotives of the Pacific Electric Railway handling the freight cars of all railroads entering Los Angeles.

The Wurster Construction Company of Los Angeles, San Diego and St. Louis undertook and accomplished in record time the construction of this plant during the strenuous war period. Also, it handled the construction of the latest unit, seven stories in height, having 500,000 sq.ft. of floor area. This addition was completed and ready for occupancy early in 1921. This building is a Class "A" reinforced concrete structure throughout, equipped with an automatic fire sprinkling system to insure the lowest fire insurance rates, electric elevators and automatic handling equipment, spiral chutes, offices for the accommodation of factory branch representatives, sales forces, manufacturing agents and wholesale and distributing firms.



AIRPLANE VIEW OF FREIGHT TERMINAL AT LOS ANGELES OPERATED BY PACIFIC ELECTRIC RAILWAY

View Showing Construction and Arrangement of Buildings

The Wurster Construction Company's contracts on all the terminal buildings included not only the construction of the buildings, but the equipment of the various manufacturing plants, including the erection of the cold storage unit. This involved the use of 8,000 tons of steel, 250,000 barrels of cement, 200,000 tons of rock and sand, 10,000,000 ft. of lumber and 200,000 sq.ft. of glass and sash, also the installation of fifty hydraulic and electric elevators, thirty spiral chutes, 500,000 sq.ft. of pavement, 3 miles of spur tracks and an automatic fire sprinkler system having 25,000 sprinkler heads, gravity tanks, underground reservoirs, automatic pumping apparatus and automatic fire alarm system. The buildings are equipped with steam heating and steam power pipe lines from a central power plant, refrigeration pipe lines, gas lines, electric light and power lines in conduit throughout.

Since a larger portion of the Pacific Electric Railway's tracks serving the terminal plant are located within pavement in and about the various terminal buildings a very permanent type of track construction was followed. In certain locations about the buildings 7-in. 91-lb. T-rail and 7-in. 127-lb. grooved girder rail was laid. Tracks were rock-ballasted and asphalt pavement laid in around this type of track construction. These spur tracks, placed to serve the terminal buildings and situated in paved sections of the terminal yards, are subject to considerable use and there is a very heavy truck and team service along, over and across the spurs for reaching the various warehouses.

One of the largest operating companies at the terminal is known as the Union Terminal Warehouse Company (the largest commercial warehouse in Los Angeles, having seven warehouses with more than 1,000,000 sq.ft. of floor space, including a warehouse located at the port of Los Angeles for storage and the handling of import, export or coastwise cargo shipments). Under the service given by this company a merchant or a co-operative body of merchants can purchase a full cargo of one commodity, thus receiving the lowest possible freight rate, a quantity price on purchase and the greatest cash discount. If the merchandise is shipped draft attached, financing is arranged whereby one's banker will surrender the bill of lading to the Union Terminal Warehouse Company and accept warehouse receipts. Assuming the bank advance is 75 per cent of the value of the merchandise, the actual cash outlay will carry 400 per cent more merchandise, purchased at a lower figure. The above example applies to both carload and cargo shipments, and many wholesale merchants are now taking advantage of the savings made possible through pool or consolidated car service.

An office section is provided for the accommodation of factory branch representatives and sales forces, manufacturing agents, brokers and firms selling through spot warehouse stock.

The accompanying table shows the very small cost per case of unloading a carload of canned goods, storing it in the warehouse and reshipping it to the consumer:

COST OF UNLOADING, STORING AND RESHIPPING CARLOAD OF CANNED GOODS

Unloading, 37½ cents per ton; cost per case	1¼ cents
Storage, per case per month	1 cent
Labor from warehouse door to storage floor, piling and redelivering to first floor delivery door	¾ cent
Total cost per case, including one month's storage	3 cents

Letter to the Editors

Recommended that All Traveling Expenses Be Paid

Brooklyn Rapid Transit Company
Brooklyn, N. Y., Jan. 10, 1922.

To the Editors:

In reviewing the articles published in the Journal of Jan. 7, 1922, and written by the presidents of the several affiliated American electric railway associations, I would like to correct one statement as regards the payment of expense of committee members.

It is not an important item, perhaps, but I do not wish to be misquoted, as the traveling expenses of committee members should, without doubt, be paid in all cases by the American Electric Railway Association, and not as Mr. Kimball has ascribed to me by the association only when the member company or manufacturer declines to pay same.

Until such time as committees are restricted to a proper membership and distributed over such area as may seem necessary, but also restricted as a strictly business expenditure, the association will not obtain proper results nor will the expense of committees be equitably distributed. It was only a few years ago that the practice of paying such expenses was discontinued, and then because of abuse, but, of course, the correction for the abuse lies within the direction of such expenditures and can be entirely controlled by the association. It is an association expense and should not be put in the light of a contribution by interested parties at any time.

W. G. Gove,
Superintendent of Equipment
for Lindley M. Garrison, Receiver.

Electric Railway Publicity

Devoted to How to Tell the Story

All Aboard for "White Mule"

Safety First Car in East St. Louis Makes Debut Amid Great Publicity—Results Significant

THE East St. Louis & Suburban Railway, East St. Louis, Ill., has placed a "Safety First" street car in regular service, bearing more than fifty signs inside and out, and the crews are giving out thousands of pamphlets entitled "A Safe Journey." D. E. Parsons, general manager, who fathered the idea, makes the following statement:

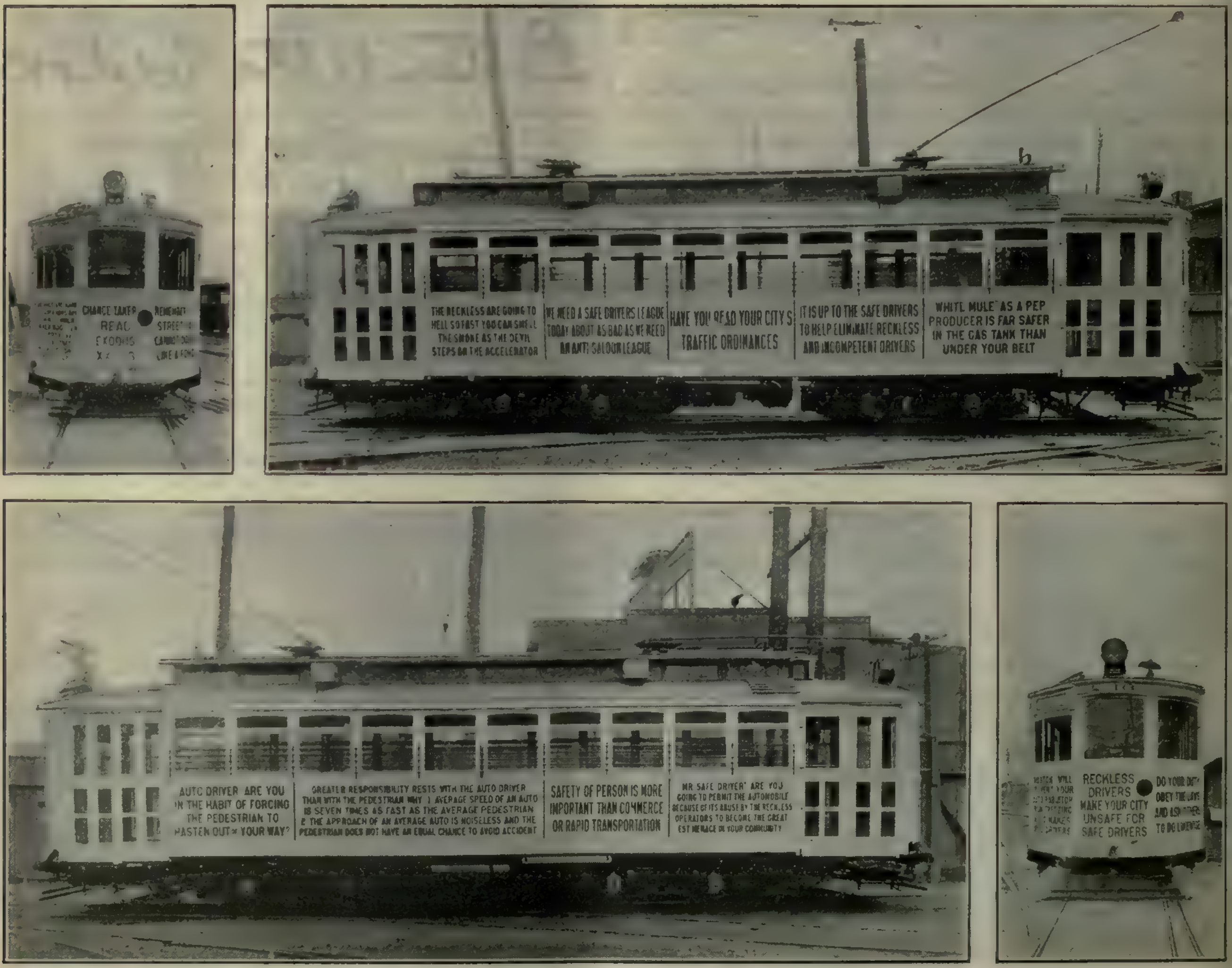
This car is one of our standard type city cars so far as the body is concerned, but the trucks are equipped with four motors suitable for interurban transportation. The car is painted with three coats of the best white enamel and the lettering is in black. All of the work was done in our own shops. The advertising racks inside of the car contain cards with slogans to the pedestrians and car riders. There are twenty-eight such cards in the car.

It has been my aim in preparing the slogans for this car, both inside and outside, to appeal to the safe driver, pedestrian or car rider to co-operate to avoid accidents and to help control the actions, if possible, of the reckless person. The car has been in service for five days and I have received no adverse criticism as to the wording of the slogans, but I have received a great deal of constructive praise. During the days this car has been in service we have not received a single "flash" report of a collision between an automobile and a street car. In the past we have had a large number of such accidents, but the period is too short to determine whether we shall not have them as usual. So far results are rather significant.

This car will be operated in regular service on the different divisions in the city of East St. Louis for about three months and then will be operated on the interurban lines. Besides the signs, four holders have been placed on the inside of the car, with the lettering "Take One," and these holders contain pamphlets. Our car has been named the White Mule.

On the front of the car these admonitions strike the eye:

Hootch will prevent your auto radiator from freezing; it also makes wild drivers. The reckless are going to hell so fast you can see the fire fly as the devil steps on the accelerator. We need a safe drivers' league today as badly as we need an anti-saloon league. Remember, a street car


THE RECKLESS ARE GOING TO HELL SO FAST YOU CAN SMELL THE SMOKE AS THE DEVIL STEPS ON THE ACCELERATOR
WE NEED A SAFE DRIVERS LEAGUE TODAY ABOUT AS BAD AS WE NEED AN ANTI SALOON LEAGUE
HAVE YOU READ YOUR CITY'S TRAFFIC ORDINANCES
IT IS UP TO THE SAFE DRIVERS TO HELP ELIMINATE RECKLESS AND INCOMPETENT DRIVERS
WHITE MULE AS A PEP PRODUCER IS FAR SAFER IN THE GAS TANK THAN UNDER YOUR BELT
AUTO DRIVER ARE YOU IN THE HABIT OF FORCING THE PEDESTRIAN TO HASTEN OUT OF YOUR WAY?
GREATER RESPONSIBILITY RESTS WITH THE AUTO DRIVER THAN WITH THE PEDESTRIAN WHY 1 AVERAGE SPEED OF AN AUTO IS SEVEN TIMES AS FAST AS THE AVERAGE PEDESTRIAN 2 THE APPROACH OF AN AVERAGE AUTO IS NOISELESS AND THE PEDESTRIAN DOES NOT HAVE AN EQUAL CHANCE TO AVOID ACCIDENT
SAFETY OF PERSON IS MORE IMPORTANT THAN COMMERCE OR RAPID TRANSPORTATION
MR SAFE DRIVER ARE YOU GOING TO PERMIT THE AUTOMOBILE BECAUSE OF ITS ABUSE BY THE RECKLESS OPERATORS TO BECOME THE GREATEST MENACE IN YOUR COMMUNITY
RECKLESS DRIVERS MAKE YOUR CITY UNSAFE FOR SAFE DRIVERS
CHANCE TAKER READ EXODUS

An Irresistible Plea of the Railway for Safety

Please Examine Your Transfers

Make sure that they are properly punched before leaving a car.

Practically all transfer errors can be eliminated if the car riders will co-operate. See that you get the transfer you ask for. If it is not correctly punched, return it to conductor, call his attention to the error, and ask him to issue a new transfer.

We ask your co-operation.

To Our Patrons:

We want your opinion of the street car service now being given in East St. Louis.

We need your help to make it better.

Your suggestions are welcomed; your criticisms will give us an opportunity of making corrections when they are well founded.

In its last analysis, street car service is a matter of co-operation, and the extent of co-operation given will be reflected in the service.

TYPICAL EAST ST. LOUIS & SUBURBAN SIGNS

cannot dodge like a Ford. Chance takers, read Exodus xx, 13. A corner hog is a driver who passes a street car intersection at high speed.

Among the more striking signs is one reading:

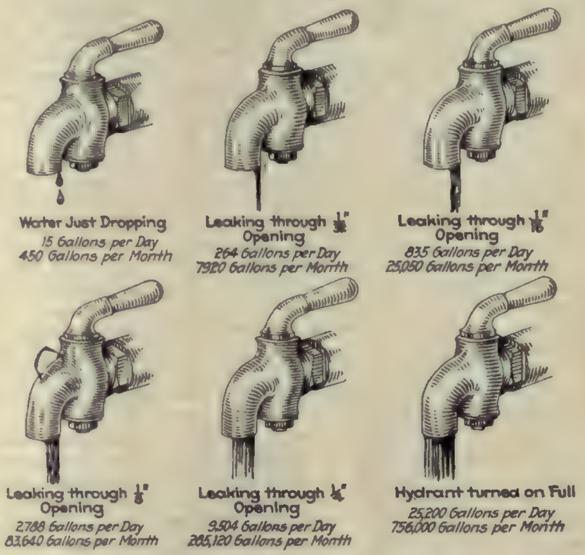
> More responsibility rests with the auto driver than with the pedestrian because (1) the automobile travels seven times as fast as the pedestrian, and (2) the approach of the average automobile is noiseless and the pedestrian does not have an equal chance to avoid accident.

Inside the car there are further admonitions in the regular advertising car space, some cryptic, some funny and one a cipher. The latter has a bunch of scrambled letters. Close inspection will show they are numbered, and placing them together the reader will discover the legend: "Don't be a Jay Walker." Others are:

> Safety of people is more important than commerce or rapid transportation.
>
> Do your duty, obey the law and ask others to do likewise.
>
> Did you know that in 1920, 841 autoists were arrested for passing a street car?
>
> Do your shopping between 9 and 4 o'clock and give the workers who have to ride later a chance to get a seat.

Signs Help Water Conservation Campaign

THE Pacific Electric Railway owns and operates, in connection with its extensive interurban mileage in southern California, several parks and seaside resorts. One of these is the Mount Lowe resort, a mile above the sea, which is reached after a scenic ride up the mountain. During the dry season strict attention must be devoted to the conservation of the water supply taken from the various mountain sources for use not only in these resorts but as a means of protection against fire.



SIGNS PLACED IN PARKS OF PACIFIC ELECTRIC RAILWAY TO ENCOURAGE THE SAVING OF WATER

A campaign was instituted to appeal to the employees of the company as well as to its guests and patrons to conserve water. A feature of this compaign was the posting in conspicuous places, where water was available, of signs similar to the one here shown to impress people with the magnitude of the waste possible even though the water drips but slowly from a leaky faucet.

The Little Rock Company Told Its Story to the Public This Way

The Electric Car a Public Blessing

It is more or less customary to "bawl out" the street car management when one has to wait for a car because a wagon has broken down on the track perhaps, but after all what a source of pleasure, at small cost, is the street car. It not only provides the means for toilers to live away from the heat and noise of the city, but it gives great opportunities for taking the air and seeing the suburbs. Look at the Sunday evening crowds to hear the music at Forest Park. Most of them are cooped up all week in offices and factories, with lungs starved for a breath of fresh air. See the little ones, any day in the week, playing on the grass at the park, putting oxygen into their lungs and red blood in their veins—and all for a nickel.

When you feel like "bawling out" the management for something probably not the fault of the company, remember the good things it achieves.

Little Rock Railway & Electric Co.

Americans Proceed At High Pressure

"Push" is distinctively an American quality and it is a very commendable quality, provided it is not carried to excess. But there is a limit to this thing of rushing through life. It is never worth while to risk life to save seconds or minutes. But it is this craze for haste which is responsible for the majority of auto accidents. The auto gets one about fast enough, but to save a second or two of time, there are drivers who persistently cut corners or who take a chance in heading off a car at a crossing, or exceed the speed limit, even on streets on which they have not the right of way, and in many other ways foolishly, often recklessly, ignore the traffic rules made in the interest of public safety.

Little Rock Railway & Electric Company

Improving Operation*

Various Ways Are Described by Which Surface Car Operation Can Be Improved to the Benefit of Company and Public

BY EDWARD A. ROBERTS
Of the Beeler Organization, New York

THE subject of improving surface car operation offers two methods of approach; one has for its primary object the saving of operating expense; the other is concerned first with the giving of better service. It should be understood, however, that these two are by no means incompatible.

One of the best places to start on a campaign for reducing operating expenses is probably the time-table department. In this department originates whatever lost motion there is in the operation of the cars on the street. This lost motion may be the result of slow running time, irregular headways, wasteful arrangement of the men's working hours, sending out cars too early, keeping them out too late, long layovers at the ends of the routes and other such items.

The matter of layovers may, to the average person, appear to be comparatively unimportant, yet the per cent of the total time that cars spend standing at the end of their routes varies from 2 per cent in some cases to 25 per cent in others; that is, from one minute to twelve and one-half minutes on a fifty-minute run. On a typical line earning 40 cents per car-mile and operating at 9.3 m.p.h., and having a 2 per cent layover, the car-hour earnings would be $3.65. But if the layover was 25 per cent the earnings would be only $2.79 per hour. After taking out the crew's wages of $1.10 per hour, the remainder would be $2.55 in one case and $1.69 in the other. This is a tremendous difference caused by just one item in the operation of the company. It is important enough to mean success or failure.

Routing of cars, and particularly turnback service, is a subject that requires constant study. American cities big enough to support street railway systems are constantly growing and changing. Factories are being constructed in undeveloped sections; the residential districts are gradually changing their characteristics. The result is that to keep up with these changes routing of the street car lines must be revised at frequent intervals, or wasted service will ensue. Yet in many cities the routing is practically the same today as it was ten or more years ago.

The economical use of power by the motormen is a phase of operation that has big possibilities. The use of measuring devices stirs up competition and encourages the men to use the minimum amount of power to take them over their routes. With such an incentive, the consumption may be reduced 15 to 25 per cent, representing a very considerable part of the operating expense.

In the equipment department there are opportunities for better service and cheaper service. The safety car comes to mind immediately in connection with modern street railway equipment. It is a familiar sight now in many cities, a lightweight car with a number of safety features and so arranged that it can be operated by one man. An important feature is that this car has materially higher acceleration than the ordinary street car, which enables it to make higher schedule speed. There are about 6,000 safety cars in use today throughout the country and they have met with the greatest success when applied so as to give a more frequent and faster service than the cars they replaced. Gross receipts have gone up, expenses have come down and the operators have received an increased rate of pay.

The success of the safety car leads us into another phase of this subject of improved service, namely, frequent headways. More people will ride if more service is given. Here are some figures of an interesting experiment made in a Western city on a route running from the railroad station across the center of the city. On the original eight-minute headway each car on the line averaged $21 per day in receipts. On a five minute headway this amount was increased to $25 per car per day. They decreased the interval between cars to four minutes and the receipts went to $29 per car per day, and on a three-minute headway they again went up, to $35. Finally the service was established on a 2½-minute basis and the daily receipts per car were $40. All this developed in less than a year.

Regularity of the service has a similar effect on the revenue. When a line has frequent delays and cars come in bunches at infrequent intervals instead of regularly, the patrons lose faith in their car service. This breaking of faith by not maintaining regular service is probably the chief cause for the popularity of destructive jitney competition where it exists.

Transportation salesmanship is a popular phrase in the street railway industry just now. There are numerous ways of selling street car rides. The best channel is through the men on the cars, for they make the sales. We learned during the recent milk strike that the men who drove the milk trucks were "route salesmen," not truck drivers, and that they received in addition to their wages a small commission on their collections of bills. Doesn't that title "route salesman" rightfully belong to the man whose business it is to sell transportation on a street car route?

The loading platform is a humble contraption that pleases the public and has a marked effect on the time required to load and unload passengers. It is an isle of safety placed in the street alongside the car tracks, where prospective passengers can assemble. The time-saving feature is that when the passenger steps up on the platform he has taken his first step into the car, and it takes him a fraction of a second less to board the car when it comes. This convenience in boarding the streeet car matches one of the chief advantages of the motor bus, curb loading.

The so-called skip-stop possesses great possibilities in speeding up the service. The term is really a misnomer; to the public of some cities a disagreeable sounding catch phrase. A better description would be "proper spacing of stops." Street car speed depends on the number of stops, of course, and the fewer the stops the faster the speed. To illustrate, if a car that can travel 20 m.p.h. without making any stops should make eight stops in a mile, each five seconds in duration, its speed would be reduced to 10 m.p.h. If it made twelve stops per mile, which is probably an average for Manhattan, the speed would be reduced to 7 m.p.h. Eight stops per mile means that the car starts and stops every forty-five seconds. An increase of 10 to 20 per cent in the number of car-miles from each car hour has been made by spacing out the stops.

There is almost an infinite number of other points that affect good surface car operation, and the number and variety of things that can be done are really limited only by the ingenuity of the management. Just to mention a few, there are prepayment areas at heavy loading points, two-car trains, telephone dispatching of cars from terminal points, electric switches, location of stops at junction points, modern methods of fare collecting and registration, co-operation with the traffic police to speed up intersection movements and the use of large legible signs on the cars.

After our street railway companies have acted on all these matters and sought to attain perfection in them, the results will completely disprove the opinion held in many quarters today that the street railway industry has outlived its usefulness.

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*Abstract of a discussion led by Mr. Roberts at the monthly meeting of department heads of the New York Transit Commission on Dec. 19, 1921.

Standardization of Ties

THE American Railway Engineering Association and the United States Forest Service have been designated by the American Engineering Standards Committee as joint sponsors for the unification of specifications for wood cross ties and switch ties for all classes of use. The work is to include the grouping of ties with regard to inspection rules and preservative treatment, but not methods of treatment. This action is in accordance with the recommendations of a conference on railroad ties, to which the American Electric Railway Association and other interested organizations had designated representatives.

C. E. R. A. Program Announced

Numerous Papers on Mechanical Subjects Will Be Presented at Two-Day Session

SECRETARY L. E. EARLYWINE has given out the following program for the annual meeting of the Central Electric Railway Association to be held at the Lincoln Hotel, Indianapoils, Ind., Jan. 26-27.

PROGRAM

THURSDAY *Jan. 26—9 a.m.*

1. Meeting of executive committee.

Morning Session, 10 a.m.

2. Annual address of president by A. C. Blinn, vice-president and general manager, Northern Ohio Traction & Light Company, Akron, Ohio.
3. Business session and reports of committees.
4. Paper, "Light-Weight Cars for Interurban Service" by P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, Akron, Ohio.

Afternoon Session, 2 p.m.

5. Report of Engineering Council by G. T. Seely, chairman, president Youngstown Municipal Railway, Youngstown, Ohio.
6. Paper, "Building Up Worn Flanges on Rolled Steel Wheels by Welding," by E. B. Gunn, superintendent of transportation, Western Ohio Railways, Wapakoneta, Ohio, and Charles Sigler, master mechanic, Winona Interurban Railway, Warsaw, Ind.
7. Discussion by R. C. Taylor, superintendent of equipment, Michigan Railroad Company, Albion, Mich.
8. Paper, "Relative Merits of Sliding Contact Shoes as Compared with Standard Trolley Wheels," by H. Savage, master mechanic, Detroit (Mich.) United Railway and C. C. Argabrite, electrical engineer, Interstate Public Service Company, Indianapolis, Ind.
9. Discussion by J. W. Osborn, superintendent of equipment, Terre Haute, Indianapolis & Eastern Traction Company, Lebanon, Ind.
   J. F. Edward, master mechanic, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.
10. Paper, "Reclaiming Track in Paved Street," by T. H. David, principal assistant engineer, Indianapolis (Ind.) Street Railway and L. A. Mitchell, engineer maintenance of way, Union Traction Company of Indiana, Anderson, Ind.
11. Discussion by
   M. Ackerman, general manager, Cincinnati & Dayton Traction Company, Dayton, Ohio.
   R. J. Custer, engineer way and structures, Interstate Public Service Company, Columbus, Ind.
   H. V. Norford, superintendent maintenance of way, Indiana Service Corporation, Fort Wayne, Ind.

Annual Dinner 6 p.m.—Dancing 8 to 11

FRIDAY, *Jan. 27—9 a.m.*

12. Paper, "Pick Up and Delivery Service," by M. Ackerman, general manager, Cincinnati & Dayton Traction Company, Dayton, Ohio.
13. Papers, "Organization and Sales Force" and "Tried and Proved Sales and Publicity Methods," by Labert St. Clair, Bureau of Information and Service, American Electric Railway Association, New York.

American Association News

Membership List Issued

A LIST of the member railway companies, of member manufacturer companies and of associate member companies, as of date Jan. 1, 1922, has just been issued by the association headquarters.

This list is issued as a part of the program of the committee on company and associate membership of the association. With a geographical arrangement of the member companies, it is easy to ascertain what companies in a given area are non-members and therefore subject to solicitation.

The committee is also urging all member companies to use the association membership emblem on stationery and advertising.

Important Educational Work Under Way

SUPPLEMENTING the preliminary note regarding the meeting of the American Association committee on education, which were printed in the Jan. 7 issue, the following items complete the story:

At the meeting, which was held on Jan. 3 the committee first considered the scope of the subject assigned, as well as the evident intent of the executive committee in outlining the field of the committee's endeavors.

The vote of the executive committee creating this committee was as follows:

> That the executive committee create a special committee which may grow into a continuing or standing committee for co-operation with educational institutions of the country with a view of bringing before the engineering schools the necessity for more new blood in the transportation business and the opportunities existing there; also to encourage, where possible, courses in electric railways and public utilities; also to arrange where possible co-operation between individual railways and engineering schools with a view to placing engineering students in summer time and after graduation.

It was the understanding of the committee that its work should cover the forms of education and training necessary to develop competent officers from within its own ranks, as well as to arrange through co-operation with educational institutions for the training and placing of technical trained men to meet the requirements of the industry.

After reviewing communications received from several sources, showing great interest in the subject, the committee decided as follows:

1. That each member of the committee write a short thesis outlining his views upon approaching the study of this highly important subject, in order that these may be published for the purpose of awakening the thought of the industry to the problem and the work which the committee has undertaken.

2. That the committee be provided with copies of all papers at present in the chairman's files.

3. That W. H. Timbie and F. R. Phillips prepare statements as to what is being done along educational lines in their respective localities, and that each member of the committee be provided with copies of these for use in ascertaining from their localities the attitude of educational institutions, and the amount of co-operation and desire to assist which exists on their part.

4. That H. H. Norris, W. H. Timbie, C. S. Coler and F. R. Phillips try to secure information as to what other industries are doing along educational lines and send this to each member of the committee.

5. That a letter be sent to member companies outlining the committee's plans, with a request for comments or suggestions as to pertinent methods of successfully attacking its problem.*

Mr. Phillips presented the question of apprenticeship systems as reported on by the committee on that subject in the Engineering Association last year, and suggested that in view of the scope of the educational committee, the function of the Engineering Association committee on apprenticeship system might be taken over by the former. In view of this, the committee also suggested that the Engineering Association forward to the educational committee any recommendations which it may have with respect to the method of handling trade apprenticeship courses.

The committee tentatively decided to meet in New York City at association headquarters about the middle of April.

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*This letter went out from the office of Executive Secretary Welsh on Jan. 9.

Equipment Committee Starts Work

THE Equipment Committee of the Engineering Association held its first meeting of the year at Association headquarters in New York City on Jan. 10. Those present were R. H. Dalgleish, Capital Traction Company, Washington, D. C., chairman; W. S. Adams, The J. G. Brill Company, Philadelphia, Pa.; H. A. Benedict, Public Service Railway, Newark, N. J.; L. J. Davis, Brooklyn City Railroad; J. L. Gould, Wilmington & Philadelphia Traction Company; Stuart Hazelwood, Midvale Steel & Ordnance Company; J. M. Hipple, Westinghouse Electric & Manufacturing Company; Robert Long, Altoona & Logan Valley Railway; A. J. Miller, Association of Manufacturers of Chilled Car Wheels; M. O'Brien, United Railways Company of St. Louis; E. D. Priest, General Electric Company; P. V. C. See, Northern Ohio Traction & Light Company, and C. W. Squier, ELECTRIC RAILWAY JOURNAL. R. W. Steigerwalt represented C. F. W. Rys, of the Carnegie Steel Company.

The nine subjects assigned to this year's committee for consideration and report were taken up and discussed, and plans were outlined for handling the work. Sub-committees were appointed on the various subjects and in order to minimize the number of these committees, subjects 1, 1A and 5 were combined and assigned to one committee. The work was divided among the committees as follows the name given first being that of the chairman of the subcommittee.

Subjects 1, 1A and 5 relating to the contours of wheels — Messrs. Daus, Adams, Benedict, Gould, Hazelwood, Miller, Rys and See. Subject 2, helical gears; Messrs. O'Brien, Gould, Hipple and Priest. Subject 3, lightning protection; Messrs. See, Hipple, Long and Priest. Subject 4, shop building; Messrs. Long, Gould and Squier. Subject 6, trolley contact devices; Messrs. Davis, Hipple, O'Brien and Priest. Subject 7, wires and cables; Messrs. Davis, Dalgleish, Hipple and Priest. Subject 8, National Electrical Safety Code; Messrs. Gould, Long and Squier. Subject 9, revision of standards and specifications; Messrs. Benedict, Adams, Hazelwood, O'Brien, Rys and See.

In the discussion, it developed that there were several other subjects which might prove of interest for an investigation by the Equipment Committee and the chairman will communicate with the executive committee of the Engineering Association in regard to further following up this work.

Merchandising Transportation

THE committee on this subject of the Transportation & Traffic Association met in New York, Jan. 9. Those in attendance were E. M. Walker, chairman, Terre Haute; K. A. Simmon, East Pittsburgh; F. W. Shappert, Chicago; Samuel Riddle, Louisville; V. S. Curtis, New Haven; W. H. Boyce, New Brighton, and J. B. Stewart, Jr., Youngstown. Among the topics discussed were weekly and monthly passes, newspaper advertising, direct solicitation of group passenger business, freight, education of employees, suggestions from them, different methods of fare collection, etc. It is proposed to hold the next meeting in Indianapolis on March 1.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Co-operation a Fact in Louisville

President Barnes Putting Into Full Effect His Ideas of Employee Participation in Management

James P. Barnes, president of the Louisville (Ky.) Railway, since the fall of 1920, has been unusually successful in restoring that company to public confidence and in rebuilding the personnel, disrupted by a strike just before he took hold. When Mr. Barnes entered upon his duties there was a 5-cent fare in Louisville and efforts to secure an increase were blocked on every side. In the spring of 1921, however, the company under Federal injunction began collecting a 7-cent fare. The case has been as far as the Supreme Court, but is back before the Federal Court of Appeals.

WINS EMPLOYEES' SUPPORT

Mr. Barnes has not merely been building up public sympathy, and getting the company back into shape, but has secured a degree of loyalty and co-operation from the employees that leaves little to be desired. A few weeks ago the officers of the company conferred with the employees, over the matter of the need for a wage cut, and the result was that the men were big enough and broad enough to decide the issue intelligently by accepting the wage reduction. There was no ill feeling. The negotiations were conducted by the company with the employees through the Co-Operative Welfare Association. How well organized this body is can be figured from the fact that of twenty-three divisions, or local units, twelve boast of 100 per cent membership in the welfare association, and of the ten carhouses, seven are registering a 100 per cent membership.

EMPLOYEE TO BECOME DIRECTOR

Just recently President Barnes at a dinner of employees of two carhouses, given by the company to the men who had led a contest for fewer accidents, announced that a worker from the ranks was to be placed on the board of directors of the company. The election of the employee-director will take place on the second Wednesday in February, a week previous to the annual meeting of the stockholders. Each member of the Welfare Association will have one vote coming in electing the director. There are six general committeemen, and all are eligible for election. At the last meeting on Dec. 20, the committeemen drew positions on the ballot. The men and departments they represent as they appear on the ballot follow:

J. E. Burdon, Motive Power.
Chester Diersing, Clerks.
George Broekers, Shops or Maintenance.
Damon L. Kehl, Maintenance of Way.
John Peters, City Motormen and Conductors.
Gus Schmidtt, Interurban Motormen and Conductors.

All units will vote upon their choice for the directorate upon the same day. In order to vote in the election the men have been joining the Co-Operative Welfare Association in numbers as there is a membership campaign on, and again there is a bit of electioneering on the part of the men. More than 90 per cent of the employees now belong to the organization.

Of course the motormen and conductors are in the majority, there being approximately 1,000 trainmen as compared with about 800 in all other departments. However, some of the inspectors and men in other departments have been with the company many years, and are decidedly popular, with the result that there is no reason why it should be a runaway race for the trainmen.

Under date of Jan 1, the company got out a letter containing a thought for company men, which has been placed on the bulletin boards, etc., and which is intended to get the entire organization to treat all other employees and the public generally with courtesy. The letter read:

> Here is a thought for 1922.
>
> The biggest asset a company can have is the good will of the public. This good will is won by ready, willing service, and above all, courteous service. Courtesy is the oil which eliminates friction between company and public, as well as within our organization.
>
> "LET'S GO"—This year in a renewed and intensified courtesy drive on the Louisville Railway properties. Treat everyone coming into your office, or meeting you in the course of your work, regardless of time, circumstances or provocation, with courtesy, and always more courtesy.
>
> I pledge you that this shall be the rule in my office, throughout 1922, and ask that you join me, so that our attitude shall be reflected in and through those with whom we come in daily contact, and the Louisville Railway enjoy the reputation, not only of the most courteous concern in Louisville, but the most courteous street railway in the country.
>
> Yours for happiness and prosperity in the new year.

The Louisville newspapers commented freely on this announcement.

Operation Will Be Resumed in Manistee

The Worth Transportation and Products Company has been granted the right to operate cars in Manistee, Mich. The company has agreed to charge 5-cent fares. The street cars here have been idle for several weeks since the old company quit business after announcing that it was unable to make expenses. References have been made previously in the ELECTRIC RAILWAY JOURNAL to the Manistee suspension.

The Worth company proposes to equip and operate a line with not less than eight cars that will have a speed up to 30 miles an hour as conditions warrant. Service inside the city limits will be one car each way every five minutes.

Ever since the experiments were conducted on the Manistee track by a special motor vehicle manufactured by the Worth company, the proposition of utilizing the tracks by a less expensively operated motor car has been discussed and pushed.

The company is considering the extension of its lines to suburban points not now reached by the tracks.

Municipal Ownership Rejected

Change in Public Sentiment Reflected in Vote on Franchise Question in Ottawa

On Jan. 3 the electors of Ottawa, Canada, passed judgment on three proposals laid before them for the settlement of the Ottawa Electric Railway question. These were municipal ownership, extension of the present franchise and service at cost.

The vote, as was given in the ELECTRIC RAILWAY JOURNAL for Jan. 7, stood as follows:

Municipal ownership:	
Yes	6,003
No	8,430
Extension of the franchise:	
Yes	8,415
No	6,070
Service-at-cost:	
Yes	3,345
No	10,639

Although the company's proposal of service-at-cost was decisively negatived, the defeat of municipal ownership was complete, and the confidence shown in the present management by the large majority for the extension of the franchise is regarded as a testimony to the fair way in which the electric railway has presented the facts of the case during the last two years.

SURPRISING REVERSAL ON MUNICIPAL OWNERSHIP

This is evidenced by the surprising reversal of the municipal ownership vote taken three years ago, before the company had done any work in the way of publicity. In 1919 the vote on a proposal to purchase the Ottawa Electric Railway in 1923 stood:

For the purchase	8,770
Against the purchase	2,309

Last year the question came before the property owners alone, on a by-law to purchase the road. The result was:

For the purchase	2,326
Against the purchase	4,438

By comparison of these figures with the vote this year it will be seen that not only the property owners but also the other electors are now opposed to city ownership and operation.

CONTEST NARROWS DOWN

The vote on service at cost is not, perhaps, a fair indication of the opinion of the electors on this phase of the question, as the contest narrowed down, as so often happens in three-cornered contests, very largely to two of the three proposals. The company's frank statement, that it will consider a renewal of its franchise only on terms involving a readjustment of fares whenever economic conditions demand such, enabled those who approved the service-at-cost plan to vote also for the franchise extension.

The educational campaign carried on in connection with service at cost has, therefore, borne good fruit in helping the electors to reach a sane decision on the merits of public as compared with private operation.

Leasing Plan Causes Split

Detroit Committee Must Confer with Full Board on Purchase Offer —City Relies on Ouster

The city and the Detroit United Railway have split on the leasing plan proposed by Mayor James Couzens. The break resulted from the Mayor's ultimatum to the company to sell its system to the city at a reasonable price or remove its tracks from Fort Street and Woodward Avenue as provided for in the ouster ordinance passed at the November election last year. This is the first hitch in the otherwise harmonious negotiations which have resulted in joint operation over some of the company's urban lines.

NO DAY-TO-DAY LEASING

The company representatives at the conference on Jan. 6 refused to consider the leasing of the entire urban system to the city on a day-to-day basis pending the placing of a purchase plan on the ballot for approval by the voters. The company officials intimated that the company could not consent to a day-to-day rental since its financial condition would not permit such action.

Whether or not the joint operation of company and city cars over certain lines will be affected depends somewhat upon later developments. The agreements reached in previous conferences provide for joint operation on the Trumbull, Hamilton, Woodward, Fourteenth, Fort and Grand Belt lines. The Trumbull cars have been running jointly for about three weeks, and city cars were also started operating jointly on the Hamilton and Woodward lines with the beginning of the new year. The city pays the company at a specified rate of 20 cents per car-mile for the privilege of operating cars over company tracks. The Grand Belt line, taken over by the city under the day-to-day agreement, at an arbitrated price, is being operated by the company, the company paying the city on the same basis.

The representatives at the conference who acted for the company were Allan F. Edwards, vice-president; Alex Dow, Jere C. Hutchins and W. F. Moore, directors; E. J. Burdick, general manager; Elliott G. Stevenson, attorney. The Mayor, members of the Street Railway Commission, Corporation Counsel Wilcox, Joseph S. Goodwin, general manager of the municipal system and Ross Schram, assistant general manager, represented the city.

ENTIRE D. U. R. BOARD TO MEET

While no statement was made by the company following the conference a statement issued by Mayor Couzens gave the following details:

> The meeting of the board of street railway commissioners and the directors' committee of the Detroit United Railway developed the surprising fact that the Detroit United Railway committee present was without full power to act, as had been represented in previous conferences with the same committee.
>
> The committee stated that the Detroit United Railway could not enter into a day-to-day rental agreement for the entire city system now, or at any other time in the future. This was due, the members stated, to the financial condition which will not permit the company to rent the lines under a day-to-day agreement and still take care of its current obligations on the transfer of the system to the city.
>
> The members of the Detroit United Railway committee declared that it would be necessary to confer with the full board of directors on the question of the sale of the system to the city and that until the board of directors itself passed on that question the committee had no power to further discuss the matter.

In the meantime a call has been made for a meeting of the entire Detroit United Railway board of directors, following which the entire board plans to meet with the Mayor and board of street railway commissioners.

The city states that unless the board of directors, at its meeting with the street railway commission, comes prepared to agree to a price satisfactory to the city, the negotiations will be terminated and the city will proceed to enforce the provisions of the ouster ordinance on Woodward Avenue and Fort Street.

Until the day when the proposal to lease was refused, no intimation had been given of the desire of the Detroit United Railway to withdraw from the proposition to rent the entire system to the city on a day-to-day basis.

No attempt was made to carry out the ouster ordinance after its passage. In fact the ordinance has not been considered as a factor in the negotiations relative to joint operation of cars since both parties agreed that no existing rights would be gained or lost by either party as a result of the negotiations. The city's offer of $388,000 for the Fort Street and Woodward Avenue lines of the company still stands and the ouster ordinance is held as a sort of club by the Mayor. If the ouster ordinance is enforced and the company removes its tracks, it is understood that the street railway commission plans to take care of traffic on the streets affected by means of buses to be operated while the old tracks are being torn up and new ones relaid by the city.

Democrats Seek to Undo Utility Legislation

The Democratic minority has introduced in the Senate and Assembly of New York two measures calculated to rip to pieces the public service commissions law as enacted last winter. One of the measures would abolish the transit commission in Greater New York and establish municipal public service commissions in each of the first and second class cities of the State. This means that all cities of 50,000 population or more would have a public service commission of its own to regulate and control all public utilities within its boundaries, leaving to the public service commission of the state the control over public utilities outside their boundaries.

The other and companion measure would establish in the city of New York, by an amendment to the Greater New York charter, a department of transportation to take the place of the transit commission so abolished. There might be some merit in this measure, if the Legislature really wanted to grant to New York city complete self-government in public utility matters.

Assemblyman Dickstein has introduced a measure, which has been before the Legislature for some years back, to compel the transit corporations in Greater New York to do away with all wooden cars within one year. The transit commission is given power to issue the necessary orders to bring this about.

This measure has the backing of the New York *World*. It apparently has little chance of passage.

126,321,809 More Passengers

Report of New York Commission Stresses Need for Additional Transit Routes

The failure of the Board of Estimate of New York City to make the appropriations necessary to complete the rapid transit lines provided for in the dual contracts, is featured in the annual report of the Transit Commission just presented to the Legislature. Contracts to the amount of $4,710,427 have been forwarded by the commission to the board. Five contracts for small jobs, representing an expenditure of $255,240 were approved.

The most important of the contracts remaining with the Board of Estimate is for the construction and extension of the Queensboro subway from its present terminus at the Grand Central Terminal through Forty-second and Forty-first Streets to Eighth Avenue. This contract, which was awarded to the Powers-Kennedy Contracting Corporation, the lowest bidder, for $3,867,138, reached the board on Nov. 22 last, with a request that the necessary appropriation be made. The matter was referred to a committee, where it still lies, along with about twoscore others, varying in importance. Indications are plentiful that the friction caused by the refusal of the board to approve the contracts will shortly create a situation that will focus public attention upon the matter.

TRAFFIC FIGURES IN DETAIL

The report shows that the increase in traffic on the various lines for the year ended June 30, 1921, was 126,321,809; that traffic increased on the Interborough lines 58,545,721 and on the Brooklyn Rapid Transit 28,188,095. The largest single increase, 53,287,147, was on the subway lines of the Interborough. There was a falling off of 14,829,624 on the surface lines in Brooklyn, and an increase of 13,533,516 on the Third Avenue Railway system in the Bronx. The falling off in surface line traffic in Brooklyn was caused, the report states, by the opening of the new subway lines.

The city, according to the report, has already invested nearly $300,000,000 in subway construction. The commission is to lay out new lines to cost $250,000,000, one-fifth of the amount to be spent every year during a five-year period. At the end of the last year there were under the jurisdiction of the commission fifty-eight street and electric railways, eleven steam railroads and two stage coach corporations. The combined net capitalization of these companies was $1,280,622,177, an increase of about $59,000,000 over 1920. The growth in traffic for the three years from 1919 to 1921 inclusive is shown herewith:

	1919	1920	1921
I. R. T. Sub.	461,147,058	586,098,633	639,385,780
Elevated....	348,188,600	369,034,477	374,293,051
B. R. T.....	305,021,402	376,782,635	404,970,640
Hud. Tubes.	86,050,815	92,250,836	95,607,645
Surface Lines:			
Manhattan..	370,084,711	349,772,761	384,128,024
Bronx.......	80,806,261	94,141,991	107,675,507
Brooklyn....	365,963,677	432,936,227	418,106,603
Queens......	46,723,575	49,562,574	51,944,034
Richmond...	15,958,198	15,007,235	15,797,894

Despite the increase in traffic the financial condition of the companies did not improve during the year. The report states:

> There was a large increase in the deficit. This deficit for the year ended June 30, 1920, was $10,725,522, while for the year ended June 30, 1921, it was $16,835,756.

Resolution Introduced Advocating Purchase by City

Councilman Morton at Richmond, Va., recently presented a resolution instructing the Director of Public Utilities and the Director of Public Works, together with the streets committee, to investigate and report upon the feasibility and advisability of the purchase and operation by the city of the railway lines of the Virginia Railway & Power Company within the city. The proposal was referred to the streets committee, which now has under consideration a number of measures designed to improve railway service in Richmond.

Councilman James E. Dickerson has presented a resolution repealing the ordinance permitting the company to charge a flat 6-cent fare in lieu of the requirements of the franchise, which provide for a flat 5-cent fare, or six tickets for 25 cents; a labor ticket at 2½ cents and a school ticket. This resolution has also been referred to the streets committee.

The streets committee will hear further from experts on the proposed valuation of the company's holdings in Richmond. In the meantime, the ordinance committee is holding in abeyance all jitney-regulation matters, until the present differences between the company and the employees over the proposed wage cut are settled.

Municipalities Favor Purchase

The ratepayers of Toronto, Canada, have voted in favor of the purchase by the city of the Toronto Suburban and the Toronto Eastern railway lines as part of a scheme to connect that city up with a system of municipally owned hydro-radials to be operated by the Ontario Hydro-Electric Commission. On the same day the following municipalities voted in favor of the purchase of the Toronto, Niagara & St. Catharines Railway, for the same purpose: St. Catharines, Niagara-on-the-Lake, Merriton, Thorold, Port Dalhousie, Louth township and Port Colborne. The village of Humberston alone voted nay. The Ontario government is opposed to publicly owned hydro-radials and warned Sir Adam Beck, chairman of the commission, that it would not guarantee the bonds for the enterprise, a special commission, appointed by Premier Drury, having, after investigation, declared that the scheme would not pay.

The municipalities, however, decided to go ahead without government assistance, and the Hydro-Electric Commission drafted by-laws to be voted by the people. Then the government again warned the municipalities that the by-laws were not in accord with the law, and that, if carried by the voters, they would one and all be disallowed. It is claimed that Sir Adam Beck was warned to take no part in the campaign, but he spoke at many meetings, with the result that all by-laws save one were carried. Sir Adam has stated publicly, however, that if the government declares the by-laws invalid his hands are tied and he can do nothing.

States Should Make Their Own Labor Laws.—The Arizona law prohibiting injunctions to prevent boycotts and picketing was held to be invalid by the United States Supreme Court on Dec. 19 in the case of William Truax, who employed his cooks for more than eight hours a day, with the result that union men boycotted the place and practically put it out of business. Chief Justice Taft in rendering the opinion pointed out that the case differed materially from that recently decided in the Tri-City Labor Council, Granite City, Ill., where peaceful picketing was declared to be legal. Justices Holmes, Pitney and Clark dissented on the ground that the states should be allowed to make their own labor laws.

Inquiry Made Into Elevated Equipment

Prompted by the train wreck on the Ninth Avenue elevated line of the Interborough Rapid Transit Company, New York, N. Y., in which one man was killed and several persons injured, the Transit Commission has begun a public examination into the adequacy and safety of the elevated railway's present equipment and also of its operation.

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WORK OF RESCUE IN PROGRESS IN NEW YORK ACCIDENT

A description of this accident was given in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 7.

Co-ordination Lacking in Transit Development Plan

Three agencies created by the State of New York—the Port Authority, the Transit Commission and New York city—are now endeavoring to solve the transportation problem of the city, and one of them, the city of New York, refuses stubbornly to co-operate with the others.

The Port Authority, working under a treaty between New York State and New Jersey, seeks unification of all transportation facilities, land and marine, in all parts of the harbor, so that goods and passengers may be landed in the most economical and expeditious manner possible. The Port Authority has been commissioned to develop the territory with which it deals, not for the immediate, selfish benefit of one sector or another but in the way which will make the best provision for all who use the water and land approaches to New York.

The Transit Commission seeks to co-ordinate and extend the passenger carrying railroads of New York's five boroughs in accordance with a design which shall make each of them most useful to the residents of the city it serves immediately, and likewise to contribute to the excellence and efficiency of the general transportation system.

The Port Authority and the Transit Commission wherever their plans have overlapped have found it practicable to work in harmony. The Tammany administration of New York has its own scheme to build transportation lines for passengers and for freight in New York city, but this scheme has not been developed in harmony with the Port Authority or the Transit Commission.

Men Vote Against Strike

Electric railway employees of the British Columbia Electric Railway, Vancouver, B. C., by a vote of 800 to 500 voted against going on strike and in favor of accepting a reduction of 10 per cent, recently recommended by a board of conciliation. The vote was taken in Vancouver, Victoria and New Westminster on Jan. 3 following a mass meeting held on Dec. 31 and a recommendation from the executive of the union to turn down the award. Better counsels prevailed and the award was accepted. The new scale, which takes effect immediately, provides for the following rates of pay in cents per hour:

Motormen and conductors:	
City lines	58½
Interurban lines	60½
Car repairers	63
Barn janitors and cleaners	52
Machinists, blacksmiths and armature winders	72
Carpenters and painters	69
Mechanics' helpers	58½
Track laborers:	
City lines	54
Interurban lines	49½

In addition to these wages, working conditions were modified to affect employees to the extent of a reduction of about 2½ per cent. The union has signed an agreement with the company which may be terminated in thirty days at any time, although the company offered to pay the proposed wages for one year.

Massachusetts Situation Improved

Relative to the electric railway situation in Massachusetts the Department of Public Utilities says in its annual report to the Massachusetts Legislature for 1922:

> Some improvement has occurred in the electric railway situation, due, in the main, to somewhat lower operating costs. . . The improvement has not been so great that any marked or extensive reduction in fares has been possible, but there are signs that lead us to hope that some reduction may be possible in the not distant future.
>
> The use of one-man cars has increased. It is possible that the use of these cars will be a large factor in enabling the companies to render to communities service that otherwise could not be furnished. With proper safeguards and over certain lines the one-man car is both safe and feasible. The commission is inclined to favor such use wherever it can be done with safety to the public and to the advantage of the companies.

On the question of jitneys the commission says:

> The use of the so-called "jitney" or "jitney bus" in competition with electric railway lines has decreased. In certain communities where there are no street car lines or where the tracks have been abandoned jitneys or jitney buses are operating.
>
> It seems apparent that the jitney or jitney bus and the trolley cannot compete to serve the same community along or upon the same or parallel lines or routes with advantage to either. To provide service where no trolley service is available or to extend and supplement service furnished by the trolley seems to be the useful and proper function of the jitney. The commission hopes that such service may be provided wherever possible. There are legitimate fields in which the jitney can operate, in all probability, to the advantage of the communities, and in such fields its use should be encouraged.

Toledoans Forsake Even "Hooch"

T. R. Strall, manager of the lost Article Department of the Community Traction Company, Toledo, Ohio, did a little reminiscing in the January number of *Sparks*, the official publication of the railway. How patrons of the cars can leave behind them some of the things they do probably becomes more mystifying each day to the corps of workers in his organization.

From umbrellas, purses, lunchboxes, fur scarfs — even "hooch" now (an enigma, indeed)—the articles are of such varied type that he believes he could supply any article necessary for any occasion. The daily routine of the business has its exacting and unpleasant duties—listening to the sad and sometimes confidential tales of the "applicants," but in his opinion for real amusement it has any show "backed off the boards."

Same Wage Scale in Effect in Atlanta

Following a recent conference between officials of the street railway department of the Georgia Railway & Power Company, Atlanta, Ga., and officials of the Street Railway Employees' union, a new contract was signed by the company and the union which carries the same wage scale during 1922 that prevailed during 1921. Wages of motormen and conductors are fixed as follows:

> For the first three months, 44 cents per hour.
>
> For the next nine months, 46 cents per hour.
>
> After nine months, 48 cents per hour.

In the event of grievances or other questions that cannot be settled by conference between the company and the union a clause in the new contract provides that such matters shall be referred to a board of arbitration, and that the decision of the board shall be accepted by both sides without further parley.

Electric Rail Transportation Permanent

Electric rail transportation is in Minneapolis, Minn., to stay, according to T. Julian McGill, vice-president of the Minneapolis Street Railway, because no other means of transportation is so safe and dependable and at the same time so cheap. He foresees no future in which the bulk of electric transportation is not on rails. Mr. McGill, in discussing the development of the city to distant districts, said:

> The necessity for rapid service to the close-in district will make necessary lighter, more quickly operated cars from the loop to a zone where transfer points are readily accessible to all outlying districts.
>
> I cannot imagine the time when the street car running on rails will disappear from downtown Minneapolis, because it will always give the most dependable and rapid service for short headway transportation.
>
> I think subways are remote here. Chicago has no subway and probably will have none for many years to come, and Minneapolis may still attain much growth without being brought to consideration of the subway problem. We may have short tunnels as for instance in the Lowry hill district on Hennepin Avenue, as a means of relieving traffic congestion and facilitating operation of cars, or a tunnel through the Kenwood hill to care for a big volume of increased business which must come with growth of the lake district. We may have an elevated line.
>
> The auto bus and the trackless trolley undoubtedly will prove effective in supplying auxiliary transportation service on streets where there is not a demand for short time headway, but because the trolley gives cheap, efficient, dependable service in the least time for the least money, I believe, it will be a good many years before the street car on rails will disappear from Minneapolis streets.

Elgin's Suggested Franchise Cares for Regular Rider

Distinguishing regular from occasional riders, and fencing off three and one-half hours each day when a 5-cent fare should be effective, the City Council of Elgin has concluded a proposal for a new franchise which will soon be presented to Federal Judge Evan A. Evans, now acting practically as overseer of the Aurora, Elgin & Chicago Railroad.

Not only does the City Council include in the proposed franchise a 5-cent fare for the hours from 7 a. m. to 8 a. m., from noon to 1 p. m., and from 4:30 p. m. to 6 p. m., and a 7-cent fare for casual riders, but the elimination of pavement assessments, with the exception of Prospect Street, for five years. The Council will also insist on the paying of other assessments already levied for new pavements or repairing. No new levies will be made for the five-year period. Annual license fees and street sprinkling will be eliminated under the new franchise to be presented, but the city will ask that the railway be required to maintain the paving between the tracks and 1 ft. outside the track.

As explained by Mayor Arwin E. Price, the proposition which the City Council is making is that the company sell twenty-ride tickets for $1 or fifty rides for $2.50, the tickets to be good only during certain specified hours. The franchise now backed by the City Council is based on the continuation of operation on the present two-man system.

T. E. Mitten Seeks Better Understanding

The Philadelphia (Pa.) Rapid Transit Company ran an interesting full page advertisement in the *Ledger* of Jan. 8 "in the Hope of Creating a Better Understanding for the New Year." One half of the page is a letter from T. E. Mitten, president of the company, addressed to the Mayor, commission bodies and citizens.

In this communication of the company the plan of the Stotesbury-Mitten management is reviewed and the achievements of ten years co-operative effort are given. In his letter Mr. Mitten stresses the point that the company should not be asked to contribute from the present earnings to make up losses sustained by operation of city built lines "as this would not be fair to P. R. T. stockholders."

The second half of the "ad" is a reproduction from the Dec. 31 "Service Talks" entitled "A Bit of Rough Sledding" and "Here's to You, Strongheart," the latter championing the cause of the bank account.

Limited Train in Canton-Akron Service Wrecked

The first car of the southbound Canton-Akron Limited train of the Northern Ohio Traction & Light Company due in Akron at 11:22, on Jan. 5, left the track at Stop 36, between Bedford and Fells, at 11, due to a broken wheel. The rear trucks of the first car remained on the track, being torn loose from the car. The second car did not leave the track. There were seventy-three persons in the two cars. Seven persons were taken to a hospital in Cleveland, but nine others only slightly injured were able to transfer and continue on their journey.

Service on the line was delayed only one hour. There were no deaths and no one dangerously injured. When the car jumped the track it ran along on the ties about 200 ft., and turned over on its side. The fact that it was a steel car, in the opinion of the management, evidently prevented a very serious accident. The car was of the 1500 type and was obtained from the Kuhlman plant about a year ago. It was only slightly damaged. The wheel that failed had been placed on the car as recently as Dec. 17, 1921.

Tell All You Know About "Safety"

The Community Traction Company, Toledo, Ohio, wants each and every employee to try to upset the dope of the wise statisticians who prophesy a total 14,000,000 injured and 100,000 killed in the United States during this year in public accidents. *Sparks* for January impresses upon conductors and motormen how large a part they can play in the spreading of the safety idea and in actually sparing lives.

As a good start for this year's safety campaign the company has started a prize story contest. To the conductor writing the best story on "Safety" as pertains to his particular position $10 will be awarded. The winner of the second best story will receive $5. This same arrangement will apply to motormen, shopmen, trackmen and to all office employees as well. All are invited to give their ideas on "Safety Always" and of course are urged to practice what they are preaching.

News Notes

Railway Franchise Drafted.—A new franchise has been drafted by the city of Champaign, Ill., and soon will be presented to the Urbana & Champaign Railway, Gas & Electric Company for approval.

Want Smoking Cars. — The Central Ratepayers' Association of Toronto, Ont., has requested the Transportation Commission to provide smoking cars for workingmen on the various routes. A recent order which prohibits smoking on street cars is alleged to be a hardship on many of the passengers.

Wants Ordinances Declared Unreasonable.—The Hammond, Whiting & East Chicago Railway, Hammond, Ind., has filed a complaint with the Indiana Public Service Commission asking that certain ordinances of the city of East Chicago, requiring extensions of the street railway system, be declared unreasonable.

Salary Ordinance Passed.—Over the veto of Mayor Hugh M. Caldwell, the City Council of Seattle, Wash., passed the salary ordinance for 1922, putting into effect reduction in all salaried municipal employees wages and placing the electric railway trainmen on the monthly basis of policemen and firemen.

Ninty-one Fatal Accidents Recorded.—The number of fatal accidents on electric railways in Massachusetts in 1921 was ninety-one. The number of accidents caused by broken or loose wheels, broken journals and axles reported was 67; accidents caused by spread rails, broken rails, defective special work, poor surface and alignment of track, 230.

No Agreement in Joliet.—Conferences are being held between J. R. Blackhall, general manager o fthe Chicago & Joliet Electric Railway, Joliet, Ill., and representatives of the railway employees with respect to the proposed reduction in wages and working conditions. It is said that the men are opposing the abolition of the nine-hour day.

People Vote Against Increase.—By 2,000 majority the people of Hamilton, Ont., voted down a proposal to allow the Hamilton Street Railway to charge a 5-cent fare, though the City Council had previously indorsed the change. The old fares of six unlimited and eight limited tickets for a quarter have as a consequence again been put into effect. The company claims that it cannot pay its way with the present rates and a curtailment of the service is expected.

Considering Electrification. — The Michigan Central Railroad is now considering electrifying its lines between Niagara Falls, Ont, and Windsor, head officials having recommended the change. With hydro power now plentiful from the world's greatest power canal at Niagara Falls, N. Y., it is estimated that it will be much cheaper than steam. It is impossible to use steam engines on the road for operation in the tunnel under the St. Clair River.

Glendale Asks for Electric Line.—Glendale, Cal., has presented a petition to officials of the Salt Lake Railroad asking that the Glendale Avenue line of the road be electrified into Los Angeles. Members of the City Council expressed the belief that the company would act upon the suggestion and the petition and that in all probability passengers would soon be able to ride from Glendale to Exposition Park in Los Angeles for a 10-cent fare.

Will Give Fuel to Charity.—The executive committee of the Indianapolis (Ind.) Street Railway has voted to give 200 cords of old ties and stringers to any charity organization applying for them. The ties are now piled on the gravel pit property at West Minnesota Street and Eagle creek. The ties and stringers will make excellent fuel when sawed and split, Robert I. Todd, president of the railway, said. The charity organization receiving the gift must haul the wood away.

Wage Cut Announced.—C. B. King, manager of the London (Ont.) Street Railway, has served notice on the employees of a reduction in wages of 3 cents an hour, to take effect on March 1. Platform men are now paid 43 cents an hour the first year, 46 the second and 48 the third and subsequent years. The new scale will mean 40 cents the first year, 43 cents the second and 45 cents the third and subsequent years. Officials of the union have announced that they will oppose the cut.

Separate Pension System Suggested.—At the recent hearing on the proposed ordinance establishing a pension fund for city employees of San Francisco, Cal., it was suggested that the names of all the employees of the Municipal Street Railways be placed on a separate pension fund and not under the general relief fund. This plan has met with the approval of T. A. Reardon, president of the Board of Public Works, and Fred Boeken, superintendent of the Municipal Street Railway.

Contends Election is Unlawful.—Efforts are being renewed to promote the extension of the East End line of the Cincinnati (Ohio) Traction Company to California, Ohio, although an ordinance authorizing the extension was overwhelmingly defeated at the recent election. The chairman of the Citizens' Committee contends that in a ruling of the Supreme Court on a referendum for the proposed extension it had been stated that the matter should be presented at a special election.

Seeks Different Extension.—Business men of Connersville, Ind., are planning to meet soon and name a committee to visit Charles L. Henry of Indianapolis, president of the Indianapolis & Cincinnati Traction Company, in an effort to induce him to extend the line from Connersville to Cincinnati instead of from Rushville to Cincinnati, as is said to be contemplated. Mr. Henry is reported to have announced at Washington a few days ago that the road would be extended from Rushville as soon as conditions would warrant the step.

Bridge Abandoned.—The Louisville and Nashville Bridge, one of the four bridges which connects Cincinnati with Northern Kentucky cities, has been abandoned for electric railway purposes, by the South Covington & Cincinnati Street Railway, Covington, Ky. The traction company, which has operated its Campbell County lines over the bridge for the past fifteen years, has no further use for the structure since the cars on these lines have been re-routed over Third Street to the Dixie Terminal, through which they are operating.

Another Chance Offered.—Owing to the success of the short story contest in the Legion number of the Railwayan, published by and for the employees of the Kansas City (Mo.) Railways, another contest will be held in the February issue. The subject of the next contest will be "Why the Kansas City Railways Has One of the Best Street Railway Organizations in the United States." All are invited to show their literary talents and also to tell the world "what we think of our own organization." A cash prize of $25 will be offered to the winner.

Will Revive Proposal to Electrify.—J. Cameron Wilson, Mayor of London, Ont., has announced that he intends to revive the proposal to electrify the London, Huron & Bruce branch of the Grand Trunk Railway, running between London and Wingham. The municipalities, he believes, will be willing to have the Ontario Hydro-Electric Commission operate the road as a radial and put up the money for its purchase. If the railway is acquired it will have to be taken over with the consent of the dominion government, as it is now a part of the Canadian National Railways system.

Ask Court to Determine Powers.—Texas and Wisconsin, in cases now before the Supreme Court, are asking that the court determine the power of the Interstate Commerce Commission to regulate intrastate schedules and passenger fares. Counsel for Texas, in his arguments, attacked the validity of sections of the transportation act providing for the establishment of the Railroad Labor Board. He also attacked the assumption of the commission to regulate railroad construction, to order abandonment of line and to supervise financing of carriers incorporated by the State.

To Confer on Headlight Standards.—David E. Matthews, chief of the railroad inspection division of the Indiana Public Service Commission, invited master mechanics of nine leading interurban systems in Indiana to confer with him on Jan. 5 about interurban headlight standards. The 1921 Legislature directed the commission to prescribe electric line headlight standards. Mr. Matthews and his staff have been making tests for several months and soon will hold the general conference to discuss the possibilities. He said the principal difficulty in prescribing a standard is the varying voltage of current available for headlights.

Commission Order Suspended.—By an order entered on Dec. 10 in Investigation and Suspension Docket No. 1450 the Interstate Commerce Commission suspended from Dec. 12, 1921, until April 11, 1922, the operation of certain schedules published in Supplement No. 2 to Terre Haute, Indianapolis & Eastern Traction Company's I.C.C. No. 70 and Supplement No. 1 to Interstate Public Service Company's I.C.C. No. 24. The suspended schedules provide cancellation of joint rates from Indianapolis, Ind., and stations in Indiana south thereof, including Louisville, Ky., to stations on the Ohio Electric Railway and points in Ohio on other lines, which cancellation would result in combinations of rates being applicable thereafter.

Financial and Corporate

Dispute Over Tax Payment

Vice-President Draper Says Cincinnati Traction Company Is Not $700,000 Behind In Taxes

A breach has been opened between the city administration and the Cincinnati (Ohio) Traction Company and action has been started which may lead to changes in the agreement under which the local railway operates. The matter came to a head following a meeting which was held at the Republican headquarters attended by city officials, members of the Republican advisory committee and Walter Draper, vice-president of the traction company.

SEGREGATION HAS BEEN CONSIDERED

The purpose of the meeting was to divulge the recommendations contained in the annual report by former Street Railway Director William C. Culkins, in which Mr. Culkins recommended the separation of the Cincinnati Traction Company from the other companies with which it is affiliated.

The report was first discussed and then a proposed ordinance deferring payments of the city's tax by the traction company for a period of six months, during which time no increase in fares could be made under penalty of nullifying the ordinance. Mr. Draper was next called upon to present his views in the matter. He voiced objections to the period for which the ordinance was drawn and to the clause repealing the entire ordinance in the event of an increase in fares.

Mr. Draper declared that the ordinance should be drawn for a period of one year, the same as the ones deferring the traction company's payment of taxes for 1920 and 1921, and explained that under the service-at-cost ordinance, if the traction company showed a deficit for two consecutive months, fares would have to be increased a half a cent a month later. Unforseen circumstances might bring about such a deficit during the life of the ordinance, he pointed out, and if the measure deferring payment of taxes should be voided by the ensuing raise in fares the necessity for payment of the year's taxes would create another deficit and another increase in fares.

As to separating the enterprises which are combined under the name of the Cincinnati Traction Company, Mr. Draper said that the company officials had considered the advisability of such a move, but that it could not be done safely until they knew what to expect from the city, and that the passage of an ordinance deferring the tax payment for six months only would give them a sufficient grasp of the future to warrant such a departure.

SERVICE-AT-COST GRANT HAS FAILED

In the discussion which followed members of the Republican advisory committee and Mayor George P. Carrel showed considerable favor to the proposition of separating the traction company from its allied interests in an effort, as one member expressed it, "to secure a condition which will set aside all the railway transportation evils of today in Cincinnati and promote the existence of a smaller rate of fare than 7 cents without danger of the same being disturbed by fluctuating conditions such as those that arise under the service-at-cost ordinance.

The opinion seemed to prevail among the committee members that the service-at-cost ordinance has proved to be a failure and is not operating to the satisfaction of either the city administration or the traction company.

A committee was appointed to consider the matter and report back without delay, formulating, if possible, a plan for the proposed separation which will meet with the approval of the city administration.

Mr. Draper said that the belief was erroneous that approximately $700,000 was due the city from the traction company. He said:

> Under the service-at-cost ordinance, if we show a deficit for two succeeding months a half a cent raise in fares is necessitated. As the payment of the city's tax, which amounts to about $30,000 a month, would have caused such a deficit, City Council passed ordinances deferring the payment of our taxes for 1920 and 1921 until they were earned, so that the car riders would not have to pay those taxes in increased fares. Accordingly, we do not actually owe for these taxes until our earnings will allow us to pay them. Under the service-at-cost ordinance, which regulates our earnings, the only way we can pay the taxes is to increase fares. But this none of us, the company, the city government, or the people, wants to do.
>
> For this reason we can not be thrown into receivership as some of our friends are advocating. We are not bankrupt. We can pay our debts when they come due, but the tax debt is not actually due, because of the ordinances deferring it.

At a recent session of the City Council a resolution calling for the forfeiture of the franchise was referred to the committee on street railroads.

Mr. Storrs Thinks Earnings Periods Are Not Comparable

A statement of the operating results of the Bridgeport division of the Connecticut Company, New Haven, Conn., for the week ended Dec. 24, as submitted to the Public Utilities Commission by President L. S. Storrs, shows that during the week of the 5-cent fare experiment the total receipts were $39,747, as compared with $39,262 received for the week ended Nov. 19, when the 10-cent fare was in force. The loss in receipts for the current week from the last week of the flat 10-cent fare was only $514, as compared with the $4,500 loss shown during the first week of the trial test.

A similar report for the Norwalk division shows that there has been a gain of $378 for the week ended Dec. 24 over the receipts of the week ended Nov. 5, which was the last week of the 10-cent fare in that city.

President Storrs in his report to the commission states that owing to the increased amount of traffic which always occurs during the week preceding the Christmas holiday the figures are not comparable with receipts for the last week before the 5-cent fare went into effect.

Hope Held Out of Lifting Receivership

Announcement was made on Jan. 4 at New Orleans, La., that plans are being formulated to effect a settlement of the receivership of the New Orleans Railway & Light Company through the formation of a new company. The negotiations are being carried on by C. C. Chappelle, representing the security holders of the company, acting in behalf of the Chase National Bank, New York, in connection with the New Orleans banks.

The Chase National Bank, acting as depositary, has had transferred to it 90 per cent of the common stock of the New Orleans Railway & Light Company, representing all the interests of the American Cities Company in the local railway, and a committee on reorganization, headed by J. K. Newman, New Orleans, as chairman, H. L. Falk, secretary, and Lynn H. Dinkins, Archibald Kains, Lewis H. Parsons and Percy Warner, is planning to reorganize the five public utilities companies controlled by the American Cities Company in accordance with plans outlined previously in the ELECTRIC RAILWAY JOURNAL.

Commissioner Paul Maloney of the Department of Public Utilities is not yet prepared to reopen the conference with the representatives of the security holders of the company, despite published reports to the contrary. When he decides definitely to do so, it is his intention to ask G. M. Dahl, vice-president of the Chase National Bank, to come to New Orleans to assist in adjusting the trolley tangle.

$24,000,000 a Year Saved by Commission at a Cost of $470,000

Harley W. Brundige, president of the State Railroad Commission of California, on Sept. 26, in addressing the Women's City Club of Los Angeles, reviewed the history of the commission and the development of its regulatory powers, while Chester Rowell, one of his associates on the commission, also pursued the subject further of the powers of this body and the prospects for their continuance.

Particularly illuminative was Mr. Brundige's detail of the organization of the department, employing 150 experts and technicians at an approximate cost to the State of $470,000 a year and a saving based on figures from the United States Labor Index, of $24,000,000 a year latterly.

Mr. Brundige further disclosed the facts that the present commission under its enlarged responsibility and powers, disposes of as much business in four days as the former commission with its limited jurisdiction applying to steam lines alone, and that of decidedly narrow range, did in forty-two years. In other words, the records show that the former commission, from 1876 until 1912, a period of forty-six years, got out twenty-three opinions and orders, while the present commission rendered 148 opinions and orders and disposed of 252 informal complaints in one month, and in the fiscal year ended July 1, 1921, disposed of 1,375 formal opinions and orders and considered 3,042 informal cases. This embraces a jurisdiction increased to 750 major utilities, exclusive of 850 autotruck and bus lines.

"Regulation will survive only if it will continue to protect the public against extortion and exploitation," said Mr. Rowell in his address further enlarging upon the subject, "with the provision that said regulation also enable the utilities to render their service and finance themselves to expand that service." Public ownership was given as the alternative of regulation, but "until we can transform our governments so as to make them fit for public ownership this public regulation must survive, as also as many utilities as possible, as long as possible after that."

Commission Will Consider Abandonment

The Ohio State Public Utilities Commission will act on the motion for abandonment of the Interurban Railway & Terminal Company, which operates a line from Cincinnati to Lebanon, Ohio, on Jan. 31.

Officials of the Cincinnati Traction Company have been asked by residents of Silverton, Ohio, through which the Interurban Railway & Terminal Company operates, to extend its service to that community, in the event that the motion of the latter company is approved by the Public Utilities Commission. The traction company now operates a line within a mile of Silverton. Walter Draper, vice-president of the traction company, said that the matter has been taken under consideration.

Kentucky Tax Assessments Announced

The Kentucky State Tax Commission has been busy the past few days in announcing the results of its assessments for taxation. Railway lines operating in only one county are taxed locally, and the State Tax Commission accepts the figures of the county taxation authorities. Included in the list of lines operating in only one county are the Louisville Railway, Owensboro City Railway, Maysville Street Railway & Transfer Company, and the South Covington & Cincinnati Railway.

The Tax Commission assessed the Louisville & Interurban Railway, which operates several suburban lines out of Louisville, and as far as Shelbyville, at tangible value of $1,107,295; and franchise at $642,705. The Louisville & Southern Indiana Traction Company, tangible value, $22,155; franchise, $97,884; Louisville & Northern Railway & Light Company, tangible, $10,000; no franchise.

Based on assessment of the Jefferson County Commissioners the Louisville Railway has been assessed at tangible value of $4,388,505 and franchise value of $6,561,495, making a total of $10,950,000. The Paducah Electric Company has been assessed on a tangible basis of $178.485 and franchise of $421,515; South Covington & Cincinnati Street Railway, tangible, $838,206; franchise, $1,611,794. A number have not been completed and reported as yet.

New Receiver for Staten Island Road.—Federal Judge Garvin has appointed Mortimer Brenner receiver of the Staten Island Midland Railway, Staten Island, New York, to succeed the late Jacob Brenner.

Financial News Notes

$300,000 Stock Issue Asked.—The Indiana & Michigan Electric Company, operating in St. Joseph, Elkhart and other counties in Indiana and Michigan, has asked the Public Service Commission for authority to sell $300,000 of its preferred stock at par to reimburse the company's treasury for expenditures which were made in improving its plants.

2,000,000 Passengers Carried.—The monthly statement of the Utah Light & Traction Company, St. Lake City, Utah, for November shows a total operation of 42,920 car hours; 414,254 car miles. There were 2,422,845 revenue paying passengers who were carried an average mileage of 0.171, with an average earning per mile of 38.22 cents.

Canadian Property Losing Money.—The municipally owned electric railway of St. Thomas, Ont., is losing $61 per day, according to the annual statement presented by the railway committee to the City Council. The fare is now 5 cents. Passengers carried in 1921 totaled 645,479, the daily average being 1,882. The revenue of the railway for the year was $30,954 and the expenditures $51,770.

Pays Dividend in Preferred Stock.—The Virginia Railway & Power Company, Richmond, Va., has declared a dividend of 6 per cent on the preferred stock, payable in preferred stock at par on Feb. 1 to stock of record Jan. 10. The dividend is for the twelve months ended Dec. 31, last, it was explained. A distribution of the same amount in preferred stock was made on this issue last January for 1920.

Authorizes Discontinuance.—The Hattiesburg (Miss.) Traction Company has been authorized by the City Commission to discontinue service on the Main and Mobile Streets line. Financial loss in operating on these particular streets is the reason for the abandonment. The commissioners believe that in authorizing this discontinuance some electric railway service can be spared by the city.

Surplus in Hagerstown.—New operating income of the Hagerstown & Frederick Railway, Hagerstown, Md., for ten months of 1921 has amounted to $493,849, which is only about $6,000 less than was reported for all of 1920. The company shows a surplus after all expenses, taxes, interest and fixed charges for the ten months of 1921 amounting to $228,456 as against $184,723 for 1920.

Temporary Abandonment Authorized.—The City Commissioners of Bozeman, Mont., have authorized a temporary suspension of electric railway service to allow the company to repair and repaint its equipment, the winter months being the best time to make such improvements. The time limit for the suspension is set at April 1. The operating company is the Chicago, Milwaukee & St. Paul.

Number of Passengers Decreases.—The Georgia Railway & Power Company, Atlanta, Ga., in its monthly report of operations for November, 1921, filed recently with the State Railroad Commission, states that the total number of passengers carried during November, 1921, was 5,936,236, as compared with 6,197,971 in the same month of 1920, a decrease of more than 250,000 passengers. Total receipts for November, 1921, were $404,339 as compared with $422,169 in the month of November, 1920.

Receivers Will Continue Operation.—Judge Avery of the Superior Court of Hartford, Conn., has approved the report of operation as filed by Harrison B. Freeman, as receiver of the Hartford & Springfield Railway, and the Judge has issued an order that Mr. Freeman, as receiver, continue the operation for four months from Dec. 10. The railway is now going through the lean months of the year, the Judge declared, and a better financial showing should be made in the early spring.

Fifty-five per Cent of Stock Sold.—The North American Company, New York, N. Y., announces that of the first instalment of 15 per cent of the new issue of stock offered to stockholders for subscription at $50 a share 55 per cent had been taken up on the last day on which subscriptions could be made. Those subscribing to the issue have an option throughout the remainder of the present calendar year to subscribe to an additional amount to stock equal to 1⅓ times the amount already subscribed for. The new stock, which is of the series "A" issue, is now being put out by the company.

Readjustment Plan Declared Operative.—The public trustees of Eastern Massachusetts Street Railway, Boston, Mass., has declared capital readjustment plan effective as of Jan. 4. It has been slightly modified by making adjustment stock non-cumulative until Feb. 1, 1924, and it has been found unnecessary to ask common stockholders to provide any common stock. The bondholders and stockholders will be notified soon when and where to present securities for necessary endorsement or exchange. The trustees express belief that prompt acceptance of readjustment plan will put the property in sound financial condition, and enable it to build up necessary credit. The plan for the financial readjustment was described in detail in the ELECTRIC RAILWAY JOURNAL for Nov. 12, 1921, page 880.

Unclaimed Bond Interest Held for General Creditors.—Federal Judge Mayer has decided against De Rothschild Fréres of Paris and Gustav Pordes, who asked the court to direct the Empire Trust Company to pay the interest due on Oct. 1, 1918, on 4½ per cent mortgage bonds of the Interborough Consolidated Corporation, the holding company of the Interborough Rapid Transit and the New York Railways. Of a fund set aside by the corporation to pay the interest, $431,910 is still on deposit. The complainants explained that the bonds held by them had been deposited in a Brussels bank and that the war had prevented them from obtaining possession of their property. The interest due the two defendants aggregates about $44,000. Judge Mayer held that as the corporation is now in the hands of a trustee in bankruptcy the funds on deposit must be held for the benefit of the general creditors.

Traffic and Transportation

Commission Will Determine Interstate Carriers

The exact extent to which the Bamberger Electric Railroad and the Salt Lake & Utah Railroad are to be considered as interstate carriers is to be determined as a result of two resolutions just passed by the Industrial Commission of Utah. The resolutions summon the Orem line and the Bamberger line to appear Jan. 10 and 11 respectively, before the commission and show cause why they should not be brought under the terms of the Utah workmen's compensation act.

Neither of the railroads has any rails extending beyond the state lines or anywhere near the state lines. Each, however, has traffic arrangements with interstate carriers, and some shipments are handled in interstate commerce, though the vast bulk of the revenues of both roads is derived from interstate commerce. Neither line has complied with the compensation act, either by insuring in a stock company or the state insurance fund or by taking the necessary procedure to qualify as self-insurers under the act.

Company Makes Appeal to Patrons

The Connecticut Company, Hartford, Conn., has put out its new transfers for the new year and on the reverse side is the following appeal to the riding public:

> In order to get new cars and other property needed to improve the trolley service, money must be borrowed which means that trolley earnings must be enough to provide a fair return on the actual value of the property. During the last five years the Connecticut Company has earned on an average of only 3 per cent on the actual value found by an appraisal made by the Public Utilities Commission. Would you be willing to purchase securities of a company showing such a financial statement? Is it not necessary for your trolley company to have the revenue needed to enable it to keep up with the growth of your city?

No Zones for Indianapolis

"There will be no zoning of the Indianapolis street car system while I'm on the Indiana Public Service Commission, I'll promise you that," said John W. McCardle, chairman of the commission, in an address before the Optimists' Club in Indianapolis recently. In leading up to this declaration Mr. McCardle said:

> We had an election here some time ago, and we elected Lew Shank as Mayor. Well, Lew is all right. He's just like I am—he makes some mistakes. And he has said that when he got to be Mayor he was going to "zone" the street car system. I want to ask if that would be fair, to go out to the outskirts, where men built homes with their little savings, and beautified them, and improved the city? That outlying ground was chiefly built on the strength of a 5-cent fare.

Turning impressively before he continued, Mr. McCardle said:

> Now, then, are we going to charge these men that made outer Indianapolis, that built it about the circumference—are we going to charge them 10 cents, while other people ride for 5 cents/ It that fair? No, I say it would be class legislation. Look out, Lew, you've got something to do before you get that done. There are some of us over there in the commission that are not going to be shoved off the track!

Then came his promise that no zoning should be done while he was on the commission.

Ten Cents in New Castle

Commission Has Ordered This Cash Rate With Eight Tickets for Fifty Cents

Local passenger fares in New Castle, Pa., and the municipalities in the Shenango Valley consisting of Sharon, Farrell, Sharpsville, Wheatland and West Middlesex, will be 10 cents cash with tickets eight for 50 cents, according to the decision handed down by the Pennsylvania Public Service Commission on Jan. 4.

New Castle is a city of 50,000 population. The railway lines there are operated by the Pennsylvania-Ohio Electric Company. The fare existing at the time of the decision was 7 cents cash and tickets six for 40 cents. Up to January, 1918, the fare in New Castle had been 5 cents, with eleven tickets for 50 cents. At that time a rate of 6 cents cash, tickets eleven for 60 cents, was instituted with the approval of the Public Service Commission.

Application was made by the company for a cash fare of 10 cents in the Public Service Commission in August, 1919. After several hearings, the Public Service Commission in March, 1920, fixed the fare at 7 cents cash, tickets six for 40 cents. In August, 1920, the company again renewed an application to the Public Service Commission for approval of a cash fare of 10 cents with the ticket rate to be fixed by the commission. The application of the company was refused on April 19, 1921, and the commission ordered the company to maintain the same rate as before. A motion for rehearing was filed by the company and was finally sustained. Several additional hearings were then had with the final result as noted above.

The lines in the Shenango Valley are operated by the Shenango Valley Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company. The fare on these lines, which serve an extensive and important industrial district, was 5 cents up to May, 1918, at which time a fare of 7 cents with tickets at the rate of six for 40 cents was placed in effect by the company and afterward approved by the Public Service Commission. In December, 1920, the company raised the fare to 10 cents cash, tickets six for 50 cents. Complaints were filed by a number of the communities, but the rate was not suspended and went into effect and has been in effect since that time. The hearings before the Public Service Commission were upon the complaints filed by the various communities, with the result that the order of the commission fixed the cash fare at 10 cents and tickets eight for 50 cents.

The new rates of fare under the tariffs filed by the company in response to the order of the commission went into effect on Jan. 11.

Court Sets Aside Authorization for Bus Operation

The Sound Transit Company, Seattle, Wash., has announced through its lawyers that it will carry its fight to the State Supreme Court for the right to restore auto stage transportation between Seattle and Roosevelt Heights. This decision was reached after an opinion of Judge John M. Wilson in the Superior Court at Olympia which set aside the order of the Department of Public Works. The department had authorized the company to operate a motor bus service subject to ordinances of the city of Seattle.

The opinion of Judge Wilson states that "such a limitation might result in a total abrogation of the rights, granted under the certificate of convenience issued by the State Department of Public Works." The opinion leaves the Sound Transit Company without authority for the operation of its service. The transit company had taken the case to the Superior Court in Thurston County, in an effort to have the limiting clause, "subject to the ordinances of the city of Seattle," stricken from the certificate. The new decision sets the whole order aside.

Judge Wilson also refused to sign an order directing the State Department of Public Works to issue another certificate of necessity without limiting clause, and the jitney attorneys at once announced their intention of appealing this decision to the Supreme Court of the state, which has already ruled that the city has the right to ban jitneys from the public streets.

In the meantime, the City Council is making strenuous efforts to provide adequate service to the Cowen Park and Fairview districts, now seriously lacking in transportation. An ordinance was introduced in Council, and referred to the utilities and finance committees, appropriating $35,000 from the city railway fund for the purchase of municipal buses to be used on the Cowen Park and Fairview lines, in connection with the street railway, but not operating into the business section.

Residents of the Cowen Park district lost their fight recently to restore jitney bus service from their district to the downtown section of the city, when the City Council rejected their petition for through bus transportation. The action was taken after the Council had received a report from D. W. Henderson, superintendent of railways, who declared the restoration of competitive jitney lines would work a hardship on the economical management of the city's traction system and in the payment of its bonded obligations. The Cowen Park residents then urged the Council to take over the operation of the feeder buses now running in the district on a fifty-fifty basis with the railway. The Council has not yet taken action on this latter move, but it is expected a favorable vote will be taken.

Reduced Fare in Chelsea

It was recently announced by Manager Hardy of the Chelsea division of the Eastern Massachusetts Street Railway that a fare reduction between Crescent Avenue, Chelsea, and Scollay Square would go into effect on Jan. 11. A twelve-ride commutation ticket will be issued for $1. This will replace the 10-cent fare which has caused considerable dissatisfaction.

Rehearing Granted in P. E. Rate Case

Hollywood and Glendale Object to Increase Which Makes Interzone Fare 10 Cents—Company Continues to Operate Under New Schedules—Commutation Ticket Prices Readjusted in Decision

A rehearing of the case of the Pacific Electric Railway, Los Angeles, Cal., which was recently granted an increase in passenger rates, has been set for Jan. 24, following a petition to the California Railroad Commission by the Hollywood Chamber of Commerce and the city of Glendale. In the meantime the railway company is continuing to collect the new fares which it put into effect on Jan. 1. For Hollywood and Glendale residents this fare is 10 cents under the new zoning system. The commission stated it would not be justified in suspending the rates, since the company had announced its compliance with the decision, a condition precedent to the new rates becoming effective.

AS STATED in the ELECTRIC RAILWAY JOURNAL for Jan. 7, the zoning system provided in the order establishes two districts in which a 6-cent fare prevails. The fare from points in one zone to those in another is 10 cents. This affects a large number of persons connected with the moving picture studios in Hollywood.

The 6-cent arbitrary charge for the 5½-mile zone in Los Angeles is eliminated. The lower mileage basis and the elimination of the 6-cent arbitrary fare result in reducing all long distance fares out of Los Angeles. Some increases will result in the case of trips too short to absorb the regular mileage charge applicable to the city zone. All fares originating at points outside of Los Angeles or between intermediate points or stations will receive the straight reduction.

Reductions in interurban fares provided for are:

One way, from 3.6 cents to 2.75 cents a mile. Round trip, from 3 cents to 2.25 cents a mile. Thirty-ride family commutation books, from 1.8 cents to 1.75 cents a mile.

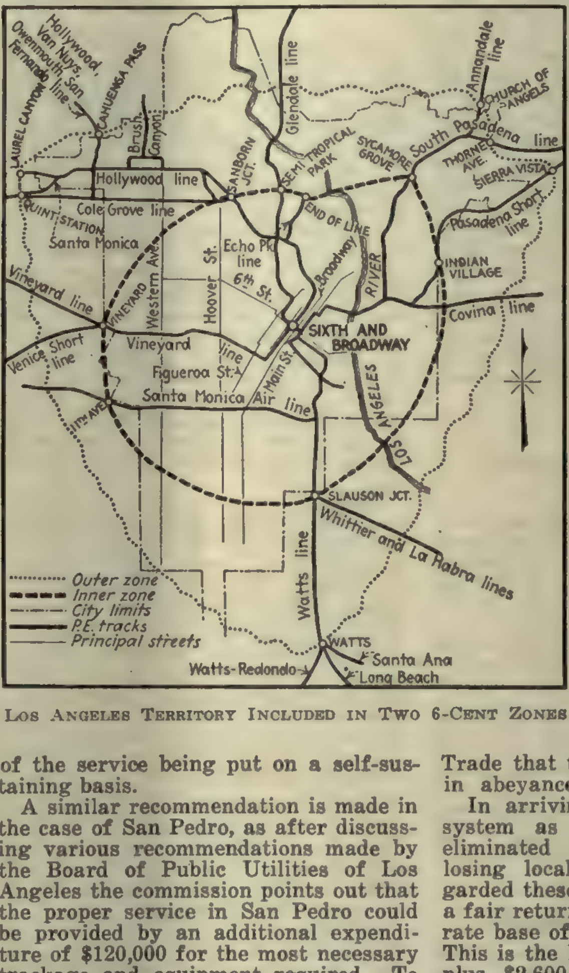
These fares are on a straight mileage basis from depot to depot.

Commutation fares will be as follows:

Ten-ride individual book, 2 cents per mile; thirty-ride family book, $1.75 cents per mile; individual calendar month book, 1 to 10 miles, 1.2 cents per mile; 11 to 15 miles, 1.08 cents per mile; 16 to 20 miles, 0.96 cents per mile; over 20 miles, 0.9 cents per mile.

In accepting the commission's decision, the Pacific Electric Railway announced that it will not oppose the plan advanced by the commission relating to universal transfers in the inner zone. A universal transfer system would be effective between the cars of the Los Angeles Electric Railway and those of the Pacific Electric. At a later date the commission may decide on an extension of the transfer privilege outside the inner zone.

Adopting the claim that interurban service cannot in fairness be made to support losing local lines, the commission directs that the Pacific Electric Railway enter into negotiations with the communities outside of Los Angeles where the company is operating other local street car lines and where this local service is not on a self-sustaining basis and report in six months either that the local service can be made self-sustaining or apply for permission to abandon such service. The opinion is expressed by the commission that the local street car systems of the company in Pasadena, Long Beach, Santa Monica, Venice, San Bernardino and possibly San Pedro can be put on a self-sustaining basis, but the commission feels that in Riverside, Redlands, Pomona and Beverly Hills there is little possibility of the service being put on a self-sustaining basis.



LOS ANGELES TERRITORY INCLUDED IN TWO 6-CENT ZONES

A similar recommendation is made in the case of San Pedro, as after discussing various recommendations made by the Board of Public Utilities of Los Angeles the commission points out that the proper service in San Pedro could be provided by an additional expenditure of $120,000 for the most necessary trackage and equipment required. To justify continued operation and annual gross revenue of $130,000 would be necessary. This is $70,000 more than was taken in in the year 1921. The commission states that no such increase can be expected with the continuation of the present motor bus competition in San Pedro.

ZONE SYSTEM FOR HOLLYWOOD ONLY NOT APPROVED

A suggestion that a zone be established for Hollywood only was not approved, the commission pointing out that the rates proposed in the present decision provide for a zone system, not only affecting Hollywood but the entire city of Los Angeles.

In the matter of school children's tickets the commission stated that the company has authority under the public utilities act to issue reduced rate transportation to children attending institutions of learning, but that the commission is not authorized to order schoo children's tickets in effect. The commission says that the company will b expected voluntarily to grant to schoo children the most liberal privilege possible under the provisions of th public utilities act.

In accordance with the order, th company has submitted plans for th betterment of Hollywood service, an on other lines too, involving $2,600,000 The plans are follows:

1. Beginning Jan. 3 about 200 additiona men will be put to work in the shops an 250 more on the tracks, to put the equipment in first class condition. This will cove deferred maintenance, which the commission recommended be taken care of. I will involve an expenditur of approximately $140,00 more per month for betterments and maintenance, o which between $60,000 an $65,000 will be the payrol for the new employees i the shops and on the tracks

2. At the earliest possible date orders will b placed for fifty new car which will cost approximately $750,000. As a standard for the Hollywoo service the company ha decided upon a center-entrance, multiple-unit-controlled car, which mean that the new cars will b of a type that can be operated either singly or in tw or three car trains.

3. The Pacific Electri Railway is not willing t submit itself as to locatio of tunnel or tunnels for betterment of the Hollywoo service, but it will prepar plans as rapidly as possibl in accordance with the order of the State Railroa Commission, though it wil ask for more time than th thirty days within whic the commission ordered tha such plans be filed.

The commission expressed agreement wit the Los Angeles Boar of Public Utilities tha there should be no further delay in improvin transportation in Hollywood and disagreed wit the Hollywood Board o Trade that the commission should hol in abeyance suggested improvement

In arriving at a rate base for th system as a whole the commissio eliminated property apportioned t losing local services and also disregarded these local losses in considerin a fair return. Accordingly a theoretica rate base of $67,021,455 was arrived at This is the historical reproduction cos plus $2,600,000 required for the improvement of the Hollywood lines. Thi is approximately $18,500,000 under th company's claim of a fair rate bas On the estimated theoretical rate bas taken by the company it is estimate that a return of 6.3 per cent might b expected.

Estimating the return in the Lo Angeles city service of the Pacific electric lines for the twelve months fro the effective date of the new rate schedule at $120,000, the commission point out that this is only slightly more tha 1 per cent on the operative propert used in the local service.

This estimate, the commission state is included to show that even under th proposed zone fare the local Lo Angeles service is little more than self sustaining and merely meets the tes which was laid down to determin whether or not the continuation of an local service is justified.

Freight rates were not cut.

Five-Cent Fare Held Too Low

Federal Court at Chicago Declares City's Lawyers Failed to Make Case Before Commission—Commission Cannot Act Arbitrarily to Force Its Views—History of Case Reviewed

Enforcement of a 5-cent fare on the Chicago Surface Lines was enjoined as being confiscatory by order of the United States District Court on Jan. 9. The temporary restraining order issued by Federal Judge Carpenter on Nov. 24 was continued in force by Judges Evans, Carpenter and Page and was made effective until a final hearing on the petition of the companies to have the writ made permanent. Meanwhile the companies are required to continue issuing transfers which have been used as rebate slips since the original order was entered.

THE ruling of the three federal judges sitting *en banc* was a complete victory for the companies. They held that the showing made by the Surface Lines supports the contention that enforcement of the order of the Illinois Commerce Commission would be confiscatory. The court said:

> The pertinent fact charged in the bill, namely, that a 5-cent fare will not permit the companies to earn enough money to pay wages, power and taxes, is unanswered by the record. In fact, the attorney for the commission stated during the oral argument that after putting all the proposed economies into effect there would be available a return of a little more than 1 per cent upon the invested capital.

One of the significant points in the court's decision was the comment made on that part of the commission's order holding that the present service is not worth more than 5 cents. "These findings," said the court, "are entirely beside the question." The court found that the actual operating expenses of the Surface Lines, comprising wages, taxes and power, amount to more than 6 cents for every passenger carried. The opinion said:

> It may be that the Surface Lines could improve their business methods, but the Illinois Commerce Commission is not permitted under the law to force that improvement by penalizing them with a rate which will not return even the operating expenses, and might in fact prevent them rendering any service at all. If the commission had the right, under the act of its creation, to order changes in operation of utilities, in this case it is aiming to accomplish its end by drastic and unlawful means. It is one thing to order changes in routing of cars; reduction in layover time to employees; remodeling of accident and law department; reduction of wages and labor; deferring maintenance and renewals; in fact, to order any variation of operation making for the public good. It is quite another thing, having in mind all of these benefits to the utilities and to the public, to say to the utilities we admit that it costs you more than 6 cents to carry passengers; we will, however, reduce your fare to 5 cents and invite you to test out our opinion as to what improvements may be made in the internal operation of your own business.
>
> The basis of the commission's action in this case is wrong. As outlined by its chairman, and urged by its counsel, supplemented by the corporation counsel for Chicago, it afforded no *cocus penitenties* for the plaintiff railroads. No opportunity was given them to try out the urged reforms. They were told in advance that the medicine was good and that they must take it whether they liked it or not, and irrespective of whether it had any therapeutic value. The orderly, rational and legal method of procedure would have been for the commission to outline these various changes in management and operation and invite the companies to put their suggestions in force, giving the companies an opportunity to demonstrate the benefits or even the possibilities of the order.
>
> All of the changes suggested by the commission are matters of conjecture and opinion, and it is quite within the range of human thought that some of the changes could not be carried out to advantage, either to the companies or to the people. Why then should the Illinois Commerce Commission, discounting impossibility of performance, direct a rate which both it and the city of Chicago admit will not pay operating expenses, to prevail until their views are adopted? Too much commendation cannot be given to any public utilities commission for its interest in public affairs. It will always be forgiven if its enthusiasm leads it to incidental legal excesses. It cannot, however, act arbitrarily to force its views without trial.

The court stated that the reduction from an 8 to a 5-cent rate of fare would have reduced the revenues of the companies by about $22,500,000 a year. Even by cutting the return to 6 per cent, if this were necessary, the judges show that there would have to be saved more than $17,000,000 out of a total of $46,250,000 for operation. They say:

> This presupposes that the plaintiff companies are grossly mismanaged. To determine whether a business is mismanaged, there is no better way than to compare its operating costs with other businesses of a similar character.

Reference is then made to the evidence on this point which showed:

> That the cost of operation of the plaintiff lines is lower per car hour than that of the traction companies in other cities of the country; that the average speed of plaintiffs' cars, excluding layovers, is the highest; and that the amounts expended in damage suits is the lowest, excluding Boston, where a large part of the railway system runs in subways and on elevated structures.

The court quotes a part of the commission's opinion which refers to decreased cost of food and dry goods. In commenting on this the judges say:

> The great difficulty with this argument is that you cannot run street cars on food and dry goods, and we have looked in vain through the record and in the briefs of the defendants to find some concrete suggestion which warrant the court, even if it were pertinent in this case, to regulate the plaintiffs' expenditures for maintenance.

The court finds that the record shows that steel rails, one of the principal materials used, will cost more this year than last because of a pre-war contract under which they were purchased last year. As to the suggestion that the companies could make a large saving in their schedules, the judges say this was foreclosed by the statement of one of the commissioners during the hearing which barred further evidence on that point. They also say there is no proof that a saving could be made in the claim department or that the cost of maintenance was too high.

In referring to the contention of the city lawyer that "the contract with the city should be taken as a whole, and that a minor return to-day to the present stockholders was a matter of no importance," the opinion says:

> This argument would make the present stockholders sustain a loss of $5,000,000 a year because other and more fortunate stockholders, dead and gone perhaps, received in the past a fair—or more than fair—return. To require the companies today to run at a loss and say that all the earnings of the companies during the entire contract period of operation should be equalized is like trying to run the mill wheel with water that has already run by.

The order on which this decision was based was issued by the Illinois Commerce Commission on Nov. 23, to become effective on Nov. 24 at midnight. It directed that fares be reduced from 8 to 5 cents and that the companies try out certain economies to offset a prospective loss of $22,500,000 in revenues. Company lawyers secured a temporary restraining order from Judge Carpenter, and several days later attorneys for both sides argued the case before Judges Baker, Carpenter and Page. Judge Baker did not take part in the decision, his place having been taken by Judge Evans. Meanwhile the companies have been issuing extra transfers as rebate slips.

It is uncertain what the next move of the city or the commission will be. The administration is pledged to secure a 5-cent fare, and the only hope for that now is that the higher court may take a view of the matter different from that of the three district court judges.

The city received another jolt on Jan. 6 when Judge McKinley of the Municipal Court held that it had not made out a case in a suit seeking to secure $3,500,000 from the Chicago Railways for use of streets. The city was unwilling to accept this money when tendered under the contract ordinance as part of the 55 per cent of net receipts.

Members of the City Council have been stirred to action recently by the successive defeats suffered by city lawyers and are insisting that some compromise be arranged for the betterment of service.

It was expected that President Blair of the Surface Lines would appear before the Council committee on Jan. 12 to outline his proposal for a new franchise.

Truck Dealers Protest Against Railway

A group of automobile truck dealers recently appeared before the City Commission of Salt Lake City with a protest against the Utah Light & Traction Company being permitted to haul either road-building materials or structural materials through the streets of the city as freight. It was claimed by the truck dealers that the truck dealers combined are paying more taxes than the traction company, and that they were entitled to recognition.

With regard to the hauling of materials for construction of street surfacing, the commission pointed out that since the people were paying for the improvement they were entitled to have it done at lowest cost. The truck companies' representatives stated that they should not thereby cause annoyance to people residing elsewhere along the line used by the street car company, especially if the difference in cost were low.

The matter was dropped when Mayor Neslen pointed out that the commission did not care to bind itself to any hard and fast policy, in view of possible emergencies that might arise, but promised that, in case the commission were not inclined at once to refuse a permit for the hauling of freight, the trucking companies would then be notified.

The railroad has at all times the right to haul freight for its own construction, under restrictions provided in the franchise, but it must obtain a permit before hauling freight for any other purpose.

Employees of Long Service Favored

In making up the new wage scale for motormen and conductors of 30 cents for the first year, 35 cents for the second year, and 40 cents thereafter, with 5 cents an hour more for safety car operators, the Virginia Railway & Power Company, Richmond, Va., has endeavored, as far as possible, to favor those employees who have been in the service in excess of two years.

Of the 583 motormen and conductors affected in Richmond, only 11 per cent are one-year men; 36 per cent are two-year men and 53 per cent come within the highest rate of wage.

On the Petersburg division only forty-two men are affected, and 24 per cent of these come within the highest rate. All others are two-year men.

In Norfolk, 302 men are affected. Twenty-four and one-half per cent of them are one-year men and a like number are two-year men. Fifty-one per cent of them come within the highest rate.

In Portsmouth, 102 men are affected; 12.6 per cent of them are one-year men; 22.4 per cent are two-year men, and 65 per cent of them will come within the highest rate of pay.

Of the 1,030 men affected throughout the entire system, 61 per cent of them will come within the highest rate under the new scale. Twenty-seven per cent of them will come within the next highest rate and only 12 per cent will be subject to the minimum rate.

Will Lower Fare Increase Patronage, Tuscaloosa Asks?

Whether or not a 6-cent fare will produce a larger revenue than an 8-cent fare is an interesting experiment that is to be tried at once by the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala. The Alabama Public Service Commission has authorized the reduction.

T. W. Ross, general manager of the company, appearing before the commission, stated that the street railway department had been losing steadily and that after careful study of the situation it had been decided to apply for a reduction in the belief that this would result in far greater patronage for the lines and a resultant increase in the gross revenue. If the experiment proves successful the company will apply for a reduction to 5 cents at the end of sixty days. In the event that increased revenue does not result the company anticipates asking permission later this year to "junk" the line.

Underground Garages Suggested for Traffic Relief

Municipal garages under Bryant and Central Parks is the solution for New York City's automobile parking problem during theater and shopping hours, which has been offered by Dr. John A. Harris, special deputy police commissioner in charge of traffic.

The garage under Central Park, it is estimated, would accommodate 30,000 cars and that under Bryant Park about 4,000. In presenting his plan to the finance and budget committee of the Board of Estimate Dr. Harris said:

> Parked cars today cause congestion, loss of life and injuries. Our plan provides that when a passenger would leave his car to enter a store or a theatre for a considerable space of time, the car should be immediately taken to Central or Bryant Park, subject to recall by an electric flashlight system probably requiring six telephone operators in each parking tunnel. Practically all the large department stores have been studying the suggestion and are enthusiastic about it. They are willing to have individual operators at their own expense to handle carriage calls.
>
> It would be feasible to have the whole plan under municipal operation. That would spread the cost to which stores and other institutions would be willing to contribute.

Changes Suggested in Utility Law

Authority from the Legislature to fix just and reasonable rules and regulations to be observed by utility companies in making extensions of existing facilities is requested by the Board of Public Utility Commissioners of New Jersey in a report filed with Governor Edwards. This recommendation follows a statement that many of the uilities refuse to make extensions of facilities unless the applicants for the service defray the costs of installation.

Another suggested change is to the effect that the law be amended so that if a utility increases its rates, the increase is disapproved by the board and its order of disapproval is set aside by the Supreme Court, the increase shall not go into effect until the board has had a reasonable opportunity to rehear the case and determine what, in the light of the court's decision, would be a reasonable standard of rates.

Referring to jitney regulation, the report states that the granting of licenses subsequent to March 15, 1921, to operate on a street parallel with the line of an electric railway appears to make the parties operating under such licenses public utilities. The board recommends that the law authorizing municipalities to enact ordinances providing for the licensing of auto buses be supplemented by a provision to the effect that if such ordinances are not enacted and licenses obtained, the operation of jitneys therein would be unlawful.

Order Ends Augusta Jitneys

By a vote of ten to seven the City Council of Augusta, Ga., ruled recently that the jitney must go, accepting a recommendation of the police committee to limit jitney bus operation. J. G. White & Company, New York, operators of the Augusta-Aiken Railway, pledged the company to maintain fifteen-minute schedules on all lines with seven and one-half-minute schedules on the principal lines during the busiest parts of the day. The company further pledged itself not to apply for increased fares within the next twelve months; to sell 8-cent tokens in lots as small as five; to charge only a 5-cent fare for school children and teachers, and to discuss with Council in ninety days the matter of reducing fares.

Some time ago the company was refused permission by the Georgia State Railroad Commission to increase its fares from 6 cents to 10 cents, whereupon it appeared before the United States Circuit Court of Appeals and secured a writ to enjoin the commission from interfering with it as to rates and received authority to increase the fare to 10 cents. This resulted in the jitneys coming back, but these vehicles are now curbed effectually by action of the Council through its new agreement with the company.

Disabled Veterans Want Lower Fare

Frank R. Spinning, supervisor of transportation in the Department of Public Works at Olympia, has been appealed to by representatives of disabled veterans in Tacoma, Wash., to use his influence in obtaining lower fares in Tacoma for disabled veterans taking vocational or placement training in the city. The appeals set forth that the allowance of the federal board of vocational training to men taking training is so low that the men seek rooms in the suburbs where rents are lower and as a result become electric railway patrons in going to and from their places of training.

They cannot afford to pay the present 8-cent fare, and ask for a reduction to 5 cents. Supervisor Spinning has announced that he will take the matter up with the Tacoma Railway & Power Company, and do all possible to secure lower fare for the disabled men.

Commutation Books to Be Issued

The Seattle & Rainier Valley Railway, Seattle, Wash., has filed with the Department of Public Works a supplement to its tariff, which in effect reduces the fare between Seattle and Renton from 20 to 15 cents. The supplement provides for the issuance of commutation ticket books, 26 tickets to the book for $3.90, to replace the present through cash fare of 20 cents. The supplement becomes effective on Jan. 15.

Opinions Expressed on Free Rides

According to an opinion of T. J. L. Kennedy, first assistant corporation counsel, Seattle, Wash., General Superintendent D. W. Henderson of the Seattle Municipal Railway cannot deny any employee of the city's traction system the right to ride free on cars. The opinion prevents Mr. Henderson from putting into effect an order he had issued, directing that only trainmen in uniform when riding to and from the city, be allowed the privilege, which order, Mr. Henderson estimated, would save the lines about $100 daily. Mr. Kennedy stated that such an order could not be put into effect without amending the existing fare ordinance, which provides that street railway employees, when furnished with a proper badge, shall ride free on street cars.

City Again Considers Fare Reduction

The municipal authorities at Hartford, Conn., are still wrangling over the question of petitioning the Public Utilities Commission for a reduction in fares of the Connecticut Company in that city. The members of the Board of Aldermen are divided as to whether it is advisable to file the petition in as much as the Public Utilities Commission has made it clear that there was no likelihood of further reductions in electric railway rates until the termination of the trial tests now in progress in the cities of Norwalk and Bridgeport. However, Hartford has under consideration the hiring of an expert to gather statistical data to be used at the hearing. For this purpose the Common Council has appropriated $1,000. The matter is now in the hands of a special committee for further consideration and report.

Hearing on Free Fare Zone Soon

A hearing on the motion for an injunction to prevent the St. Paul (Minn.) City Railway from abolishing the so-called free fare zone between Snelling Avenue, St. Paul, and Emerald Street, Minneapolis, will probably take place on Jan. 14. Judge F. M. Catlin of the Ramsey District Court on Jan. 6 refused to issue a temporary restraining order on the ground there was not sufficient reason given for such order. The company had decided to abolish this zone at midnight on Jan. 7.

Judge F. M. Catlin and Judge J. C. Michael already in a previous hearing for injunction against the 7-cent fare asked by the company had stated that fares should be collected in this zone. For many years passengers have ridden for one fare to Snelling Avenue and to Emerald Street from either city, whereas the through fare is 10 cents. The neutral zone, which is all in St. Paul, is about 2 miles in width.

Louisville Fare Case to Be Argued in February

The suit of the Louisville (Ky.) Railway against the city of Louisville to prevent the city from interfering with the collection of a 7-cent fare will be argued before the United States Circuit Court of Appeals at Cincinnati during the mid-winter term of court in February.

The case has been returned from the United States Supreme Court. The argument will be on the original motion, that of dissolving the temporary injunction granted by Judge Walter Evans of the United States District Court at Louisville, restraining the city from interfering with the company in collecting the 7-cent fare.

The case was taken to the Supreme Court on certification of the Circuit Court of Appeals, but was returned by the higher court to the lower court for trial on the ground that the Supreme Court is without jurisdiction.

Two Million Passenger Decrease

Two million fewer passengers rode on the lines of the Lincoln (Neb.) Traction Company during the last year, which reduced the revenue $170,000. This was made known by W. E. Sharp, president of the company, in his annual report to the stockholders. He suggested a lower fare for ticket buyers, and a higher fare for the casual rider.

The report stated that the company had reduced its floating indebtedness by $50,000. Operating expenses have been considerably cut, through reduction in prices of fuels and other materials which have been used in overhauling 50 per cent of the equipment, but the cut in revenue almost offset this. The payment of dividends on preferred stock has been delayed until securities can be sold to care for the indebtedness.

The slump in passenger traffic was due to the increase in auto traffic according to Mr. Sharp, who looks forward, he said, to a return to a higher level as soon as automobile owners have outgrown the novelty of using their machines. The recklessness of drivers who go at a great speed through the streets where there are trolleys, accounts for a large number of the accidents. Statistics of the company showed that 70 per cent of the accidents were automobile accidents, with a steady decrease in "boarding and leaving" car accidents.

Reduced Week-End Fares in Effect

Reduced week-end fares on the Sacramento Northern Railroad and the San Francisco-Sacramento Railroad effective on Jan. 6 were authorized by the Railroad Commission on Dec. 30 upon the application of Zac T. George, traffic manager of the Sacramento Northern, also acting in behalf of the San Francisco-Oakland Terminal Railways, San Francisco-Sacramento Railroad and Gridley Auto Bus Company.

The week-end schedule approved is as follows:

Friday to Tuesday fares—One and one-half fare for the round trip.

Saturday to Monday fares—One and one-third fare for the round trip.

Sunday excursion fares—One and one-fifth fare for the round trip.

Placing the week-end fares on a uniform basis will result in increases from San Francisco-Oakland to Oroville and to Marysville. Present fares now apply only from the bay points named to Marysville and Oroville, while it is desired to establish the fares between these cities as well as between all points on the electric lines.

The increase in the Friday to Tuesday fares now applying from San Francisco to Oroville is 18 cents and from Oakland to Oroville 30 cents; from San Francisco to Marysville 63 cents, and from Oakland to Marysville 75 cents.

Fort Worth Waits on Galveston Decision

Settlement of the controversy between the city of Fort Worth, Tex., and the Northern Texas Traction Company, involving the validity of the 7-cent fare, is expected to follow immediately on the settlement of the Galveston, Tex., electric railway fare fight, which is now before the United States Supreme Court. The Fort Worth case has been held up awaiting a decision in the Galveston case, as the two cases involved the same issues. The findings of the Supreme Court in the Galveston case will furnish a precedent for the settlement of the Fort Worth case, according to Corporation Counsel R. E. Rouer.

The electric railways of Fort Worth and Galveston had been operating under similar franchises, in which the traction company was permitted to charge a fare deemed adequate to cover cost of operation and provide a fair and just return on the investment. The traction company could raise fares without an order from the city government. When such increase was put into effect, the city sought an injunction to restrain the traction company officials from collecting the increased fare, and the matter thus found its way into the courts.

The Northern Texas Traction Company raised fares to 7 cents and the City Council then adopted an ordinance directing the traction company to lower fares to 6 cents which the traction company declined to do. The matter has rested at this point, neither side to the controversy taking action pending a decision in the Galveston case.

Transportation News Notes

Lower Rates in Effect.—The Dayton & Troy Electric Railway, Dayton, Ohio has announced a fare reduction of approximately 10 per cent on round trip tickets. Lower rates became effective on Jan. 1.

Round-Trip Fare Cut.—A round-trip ticket between Washington, D. C., and Alexandria, Va., is now being sold for 40 cents by the Washington-Virginia Railway. This is a cut of 4 cents each way. The ticket is good for a period of five days.

Short Line Advances Rate. — The State Public Service Commission has authorized the St. Louis & Jennings Railway, St. Louis, Mo., to sell six tickets for 25 cents. The old rate was seven tickets for 25 cents. This short line runs on Floriscant Avenue to Jennings station in St. Louis County.

Wants Five-Cent Fare. — Ward 3 Improvement Association of Quincy, Mass., at a recent meeting expressed its sentiment on the 5-cent fare, declaring that it was time for the Eastern Massachusetts Street Railway to put into effect a lower fare. The demand was for a 5-cent charge from the Braintree line to Quincy Square and from East Milton to Quincy Square.

Lower Fares on Short Lines.—Henry L. Doherty & Company, the operating managers of the Hattiesburg (Miss.) Traction, have announced that a 5-cent fare has been put into effect on three short lines without transfer privilege. Aside from these lines the cash fares remain at 10 cents with three tickets for 25 cent. The management states that the report of a general reduction in fares from 10 cents to 5 cents is unfounded.

Traffic Signals Approved.—Electric traffic signals controlled from a tower at what is known as Five Points in Atlanta, Ga., one of the most congested crossings to be found in any city of the south, have proved so successful in controlling and expediting traffic at this point that extension of the system throughout the downtown section of the city is being strongly advocated by R. S. Turner, city electrician. It is considered likely that due to the success of the experiment at Five Points five other traffic signal towers may be installed at the more congested crossings in the downtown section of Atlanta during the present year.

Announces Through Freight Service.—Jamestown, N. Y., which has been without competition in freight service since the sale of the Jamestown, Westfield & Northwestern Railroad to the A. N. Broadhead interests, is now to have the advantage of a second railroad as far as freight is concerned. Arrangements are being made by which the Pennsylvania Railroad will make shipments in and out of Jamestown over the Jamestown, Westfield & Northwestern Railroad, which will haul the cars by electric locomotives to the junction of the two roads at Mayville, N. Y. This road has been operated electrically for ten years, but has not carried any through freight.

Personal Mention

James Holcomb Is Commissioner

Attorney Succeeds Fielder Sanders as Head of Cleveland's Street Railways for Two Years

James W. Holcomb, an attorney of Cleveland, Ohio, has been named by Mayor Fred Kohler to be Cleveland's street railway commissioner for the next two years, succeeding Fielder Sanders, who resigned on Dec. 31.

Mr. Holcomb is sixty-four. He has had considerable experience in electric railway operation from a legal, financing and constructing standpoint. He was instrumental in the formation of companies to build the Columbus, Delaware & Marion Electric Railway, the Buffalo, Dunkirk and Western line, the Cleveland, Painesville and Ashtabula line and the Cleveland, Alliance and Mahoning Valley line.

J. W. HOLCOMB

Several years ago, however, he sold most of his railway interests and became an investor and broker in real estate. A number of years ago he was active in politics.

Born in Portage County of parents of Connecticut origin, Mr. Holcomb received his early schooling in Ravenna, Ohio, and later went to Cornell University. Returning to Ravenna he studied law and practiced there, and served three terms as Mayor. In 1892 he removed to Cleveland, where he practiced law.

R. B. Hincks Now Attorney for Strickland Properties

With the reorganization of the various utility and electric companies of which the late Col. J. F. Strickland of Dallas, Tex., was president, including the Dallas Railway, the Texas Electric Railway, Texas Power & Light Company, Dallas Power & Light Company and other companies, reorganization of the legal department of these companies is also announced. Robert B. Hincks, who has been a member of the law firm of Templeton, Beall, Williams & Callaway, which has been general attorneys for all the Strickland companies, has resigned from this company to become general attorney for the Texas Power & Light Company and the Dallas Power & Light Company, thus effecting a separation of the legal heads of these two companies from the other Strickland interests. Joe A. Worsham and A. S. Rollins are now associated with the law firm of Templeton, Beall, Williams & Callaway, which firm now becomes Templeton, Beall, Williams & Worsham. This firm will continue to represent the Texas Electric Railway and Dallas Railway.

C. C. Chesney Receives Edison Medal

Cummings C. Chesney, chief engineer and general manager of the Pittsfield works of the General Electric Company, was the recipient for the year 1921 of the Edison Medal "for meritorious service in electrical science or electrical engineering or electrical art." This award, which is made by a committee of twenty-four members of the American Institute of Electrical Engineers and which is among the highest honors of the kind in the field of electrical engineering, was made to Mr. Chesney for his work in the development of transmission apparatus, generators, condensers, transformers and converters during his association with the late William Stanley of the Stanley Electric Manufacturing Company, Pittsfield, Mass., which concern was amalgamated some years ago with the General Electric Company. Mr. Chesney is one of the pioneers in electrical discovery. He made plans for the first successfully designed, advanced types of alternating-current generators for high voltages.

H. M. Ingram Executive Officer of New York Commission

Harry M. Ingram of Potsdam, New York, has been appointed executive officer of the Public Service Commission by Chairman William A. Prendergast. Mr. Ingram will have general supervising charge of all bureaus in the commission. The necessity of an executive who would co-ordinate under one head the various activities and functions of the Public Service Commission and its bureaus has long been evident.

Mr. Ingram was a law partner of the late Edwin A. Merritt, who was speaker of the New York State Assembly in 1912, and has had twenty years experience in the state service. He is considered one of the best executives in the state.

For the past fifteen years most of his time has been devoted to legal construction work in the building up of important legislative measures. He assisted in the preparation of the consolidated laws of New York State in 1907 and 1908, was a member of the board of statutory consolidation and later was associated with the joint legislative committee on the simplification of civil practice, which prepared the new court practice act in this state.

Mr. Ingram watched the public service commission law grow from its infancy and is thoroughly familiar both with its intricacies of construction and its possibilities of execution. The position was created by the State of New York with the idea in mind that it would assure to the people a more conscientious and thorough administration of the public service commission law. It is generally regarded as a step in the right direction.

Edits Service Bulletin

E. F. Kelley Heads Publication of the Kentucky Public Utilities Association

E. F. Kelley, Louisville, Ky., has just been made editor of the *News Service Bulletin*, a bi-monthly publication of the Committee of Public Utility Information of the Kentucky Association of Public Utilities.

Mr. Kelley is secretary to James P. Barnes of the Louisville Railway. He has been with Mr. Barnes continuously since 1905. From 1903 to 1905 Mr. Kelley was with the New York Central, and thereafter was with Mr. Barnes at Syracuse, Utica, Rome, Little Falls, Oneida, Rochester, and Schenectady, N. Y. In 1920 he became secretary to Mr. Barnes at Louisville.

E. F. KELLEY

Mr. Kelley has been active in many interests in Louisville. Besides efficiently making the decision as to who shall and who shall not see Mr. Barnes, Mr. Kelley has served as secretary of the Kentucky Association of Public Utilities. His keen knowledge of traction affairs in the state and country and his realization of the difficulties confronting utility companies in their relations to the public fit him especially for leadership as editor of the *News Service Bulletin*. He will be able to forward the constantly growing understanding between the public and the companies. Mr. Kelley is also editor of *Trolley Topics*, the house organ of the Louisville Railway.

Mr. Kelley is a member of the Transportation Club, the Board of Trade and Electric Club, and secretary also of the Kiwanis Club.

Senator Thomas Brown, of Middlesex county, New Jersey, will shortly be named chief counsel for the New Jersey State Public Utility Commission. L. Edward Herrmann, the present chief counsel, will retire to engage in the private practice of law.

C. Murphey Candler, Atlanta, Ga., who has been chairman for several years of the Georgia State Railroad Commission, definitely announced in January that he would not be a candidate for re-election following the expiration of his present term next August.

H. H. Dean, Gainesville, Ga., has been named district counsel for the Georgia Railway & Power Company, Atlanta, to look after the company's legal interests in the northeastern judicial circuit of Georgia. Mr. Dean has been connected with the company several years.

Thomas Brown, Perth Amboy, has been named new general counsel to the Board of Public Utility Commissioners of New Jersey. He succeeds Mr. Herrmann, who will remain as special counsel to the board during the progress of the Public Service Railway's suit in the federal courts for a permanent 8-cent fare.

James A. Perry, of Atlanta, Ga., a member of the Georgia State Railroad Commission, is being seriously considered by President Harding, it is reported, as an appointee to membership of the Interstate Commerce Commission to fill a vacancy in a Democratic seat recently created. Southern industry is advocating the appointment of Mr. Perry, who is nationally known among public utility officials as president of the National Association of Public Utility Commissioners. His term as a member of the Georgia commission expires next August, but he has already announced that he will be a candidate for re-election to this office.

Obituary

Frank E. Haff, fifty-nine years old, secretary and assistant treasurer of the Long Island Railroad, and of its subsidiary electric railways on Long Island, died on Jan. 2. Mr. Haff entered the employ of the Long Island Railroad on Nov. 1, 1881, as a telegraph operator at the Islip station. He was transferred to the station at Babylon and from there he was promoted into the executive offices and he filled successively various posts until he was made secretary in 1900.

S. H. Pickard, manager of research and efficiency expert for the San Francisco-Oakland Terminal Railways, died suddenly on Dec. 30, as the result of self-inflicted injuries. W. R. Alberger, vice-president of the company, said that Mr. Pickard's act was clearly that of a man not in his right mind. It is the general belief that Mr. Pickard was temporarily unbalanced as the result of the request made to him for his resignation. Mr. Pickard, who had been with the company for eleven years, as special accountant in the auditing department and later as efficiency expert, served in the Philippines during the Spanish-American war with the Thirteenth Minnesota Infantry. Recently he received a commission as captain in the 159th Infantry, California national guard. He was a member of John Jacob Astor Post, Veterans of Foreign Wars, and a prominent member of a number of Oakland business luncheon clubs.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Some Power Plant Development in 1921

Equipment Furnished by One Manufacturer Cited to Illustrate the General Tendencies

In its annual review of engineering accomplishments of the company for the year 1921 the Westinghouse Electric & Manufacturing Company lists a number of power plant installations which are of interest in showing the types of power plant equipment which are being erected by designers under present operating conditions on large power systems. The review, which was prepared by H. W. Cope, assistant director of engineering of the company, states that during the past year a second 70,800-kva., cross-compound turbine generator has been installed at the Colfax station of the Duquesne Light Company, Pittsburgh; this unit is served by four 25,000-sq.ft. Westinghouse surface condensers, equipped with motor-driven circulating and air pumps. The condensers are built with divided water boxes which permit of continued operation under somewhat reduced vacuum while the condensers are being cleaned. Two 43,750-kva. turbine units with surface condensers have been installed at the Hell Gate station of the United Electric Light & Power Company, New York. A 35,300-kva. turbine-generator is now ready for operation at the new Calumet station of the Commonwealth Edison Company, Chicago. One 31,250-kva. turbine-generator with surface condenser is being installed by the Havana Railway, Light & Power Company, Havana, Cuba, and a similar unit is now under construction. A 25,000-kva. unit with jet condenser has been installed by the United Electric Company, Springfield, Mass. Two 25,000-kva. units with 40,000-sq.ft. surface condensers are under construction for the Osaka Electric Light & Power Company, Osaka, Japan. A 47,500-kva. cross-compound unit with jet condenser has been put in operation by the Narragansett Electric Light Company, Providence, R. I. Two 25,000-kva. units with jet condensers have been put in service by the West Penn Public Service Company, Johnstown, Pa., and a similar unit also by the Virginia Power Company, Nitro, W. Va.

Multiple-retort underfeed stokers have been constructed and put in successful operation in combination with the largest boilers ever equipped with a single stoking unit. To facilitate the removal of ashes, double-roll water-cooled clinker grinders have been provided at the innermost end of the stoker. In another large stoker installation each boiler is equipped with a double stoker, firing being done from both ends of the boilers, extremely high combustion rates having been secured, providing good economy at high overload capacities.

The review calls attention to the demand for synchronous condensers in large sizes in connection with power transmission systems. One of the interesting orders comprises three 15,000-kva. and four 8,000-kva. synchronous condensers for the Midi Railway electrification in France.

There seems to be no limit to the sizes in which power transformers can be built. What the review states to be the largest installation of power transformers ever made by one manufacturer comprises fifteen 15,000-kva. 25-cycle units at Queenstown, Ontario. These hold the record for single-phase transformers as to size.

In smaller apparatus, the Westinghouse company has also had some interesting developments during the past year. For the United Railroads of San Francisco two 2,000-kw. synchronous converters were equipped with transformers and tap-changing switches which permit of variation of the direct-current voltage under load. An automatic hydro-electric generating station control was installed for the Blue River Power Company, South Seward, Neb. Further, the automatic service restoring short-circuit interrupters and the automatic sectionalizing equipment for railway feeders have been developed.

Electrification Survey on Canadian Railroad

In connection with proposals to electrify the Tesniskaning & Northern Ontario Railway and its branches, either as a whole or in part, the company's commission has authorized S. B. Clement, chief engineer, and J. G. Kerry, consulting engineers, to report as to the power possibilities along the route, the power requirements for operation, and the general feasibility of electrification. A report, says the *Canadian Railway and Marine World*, is to be ready about the end of March.

There are some very extensive water powers on the Abitibe River, which can be reached for development with the completion of the extension of the Temiskaming & Northern Ontario Railway from Cochrane for 70 miles northwesterly, for which tenders have been asked. It is estimated that approximately 300,000 hp. can be developed at two of the falls alone.

Metal, Coal and Material Prices

Metals—New York	Jan. 10, 1922
Copper, electrolytic, cents per lb.	13.50
Copper wire base, cents per lb.	15.12½
Lead, cents per lb.	4.70
Zinc, cents per lb.	4.77
Tin Straits, cents per lb.	32.37½
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.68
Somerset mine run, Boston, net tons	1.80
Pittsburgh mine run, Pittsburgh, net tons	2.15
Franklin, Ill., screenings, Chicago, net tons	2.00
Central, Ill., screenings, Chicago, net tons	1.88
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, New York, cents per lb.	6.50
Weatherproof wire base, N. Y., cents per lb.	16.25
Cement, Chicago consumers net prices, without bags	1.97
Linseed oil, (5 bbl. lots), N. Y., cents per gal.	74.00
White lead, (100 lb. keg), N. Y., cents per lb	12.25
Turpentine (bbl. lots), N. Y., cents per gal.	88.50

Malleable-Iron Foundry Completed by Ohio Brass

Operations have been started in the recently completed malleable-iron foundry of the Ohio Brass Company at Mansfield, Ohio, according to an announcement made by the company. The addition to the plant is on land adjoining the older Mansfield works, but has separate receiving and shipping facilities. There are three buildings in the addition, including a foundry, a powdered-coal plant and a compressor building. The foundry proper has 100,000 sq.ft. of floor space with provision for the installation of seventy-two machine molders.

An interesting feature of the plant is the use of powdered coal as fuel to heat the core ovens, melting furnaces and annealing furnaces. To house the coal powdering facilities a building 35 ft. x 70 ft. x 55 ft. has been erected, and a 4-in. pneumatic tube is used to distribute the coal to the various points of its consumption in the foundry building. A vacuum cleaning system has been installed to keep the coal building free from coal dust and dirt.

$326,000 Invested in Substations by Pacific Electric

During 1921 a number of very important additions and improvements for the betterment of service were made to the power distribution system of the Pacific Electric Railway. All of the new electrical equipment installed represents the very latest developments of the electrical industry in automatic equipment, motor-generator sets, synchronous converters, transformers and auxiliary devices.

Following is a list of the more important projects started or completed during 1921:

Description	Amount Expended
Consolidation of 600 and 1,200 volt substations in new concrete substation building at San Bernardino	$80,000
Construction of new 1,000-kw., 600 to 1,200 volt portable substation	50,000
Installation of 1,500 kw. synchronous converter in Valley Junction substation	52,000
Construction of new substation and installation of 750 kw. synchronous converter automatic equipment at Van Nuys substation	55,000
Construction of new substation and installation of 1,000 kw. synchronous converter automatic equipment at Arcadia	70,000
Installation of additional equipment and additions to Altadena substation	19,000
Total Expenditures	$326,000

Electric Railway Construction in Norway

Information from Christiania states that the Norwegian Storthing has granted a concession to A.S Akersbanerne for the construction of an electric railway from the center of Christiania to Ostensjo, a distance of about 8 km. (5 miles). Work on this line will be commenced simultaneously with the construction of the Majorsteun-Sognsvandet Railway, a concession for which was also granted recently.

The Christiania Electric Tramway Company will soon begin construction on the extension of its Lilleaker line to Stabaek. This work will cover a distance of about 4 km. (2.5 miles).

Rolling Stock

Macon Railway & Light Company, Macon, Ga., has announced through L. A. Magraw, general manager, that the Macon company spent during 1921 a total of $112,000 for new equipment, including thirteen new electric railway cars and new electrical apparatus for other cars.

Tampa (Fla.) Electric Company has furnished the following specifications of twelve Birney safety cars which were purchased from the St. Louis Car Company and recently placed in operation in Tampa:

Number of cars ordered	12
Name of road	Tampa Electric Company
Date order was placed	June 27, 1921
Date of delivery	Nov. 2 and Nov. 11, 1921
Builder of car body	St. Louis Car Company
Type of car	Birney Safety Car
Seating capacity	34
Weight total	16,000 lb.
Length over all	28 ft. 0 in.
Truck wheelbase	8 ft. 0 in.
Width over all	8 ft. 2 in.
Height, rail to trolley base	12 ft. 7 in.
Body, wood, semi-steel, or all steel	Steel
Interior trim	Mahogany
Headlining	None
Roof, arch or monitor	Arch
Equipment:	
Air brakes	Westinghouse
Armature bearings	Ball
Axles	3¾″ O. H. steel, heat treated
Bumpers	3-in. Channel Iron
Car signal system	Faraday
Car trimmings	*Bronze
Conduits and junction boxes	Duraduct
Control	WH-K-63-BR
Couplers	Bar & Pocket
Curtain fixtures	National Lock Washer
Curtain material	Double Pantasote
Designation signs	Hunter Illuminated
Door operating mechanism	Air
Fare boxes	Johnson-Dapron Air Motor
Fenders or wheelguards	HB Life Guards
Gears and pinions	Half WH-Helical, Half GE
Hand brakes	St. Louis Drop Handle
Heater equipment	None
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	St. Louis
Lightning arresters	6-WH-MP-3, 6 GE Aluminum Cell
Motors	6-WH-508 AN, 6 GE 258-C
Motors, outside or inside hung	Inside
Paint varnish or enamel	Enamel
Registers	International DH10
Sanders	Ohio Brass
Sash fixtures	O. M. Edwards
Seats	Heywood-Wakefield Company
Seat material	Bottom Birch Back Cane Panel
Springs	St. Louis
Step treads	Feralun
Trolley catchers or retrievers	Ideal
Trolley base	Ohio Brass
Trolley wheels or shoes	Wheels
Trucks	St. Louis No. 7 Safety
Ventilators	Utility
Wheels (type and size)	Cast 24-inch

*Aluminum stanchions.

Track and Roadway

Public Service Railway, Newark, N. J., has reconstructed 10.55 miles of track with new rail, and 9.60 miles with renovated rail. There are still from 70 to 90 miles of track to be renovated, according to Richard E. Danforth, vice-president and general manager of the company.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has been granted permission to install a grand union at State and Broad Streets, Trenton. The special work will eliminate the backing up of trolleys at that point. The plan was indorsed by the Board of Public Utility Commissioners.

Public Service Company, San Antonio, Tex., announces a program of improvements and betterments for 1922 involving the expenditure of $1,500,000. According to E. H. Kifer, vice president and general manager, new lines and extensions will be built into several growing districts, providing street car service for these districts during the year. Last year the company spent $1,029,855 in extensions and betterments outside of the upkeep and maintenance fund.

Hamilton (Ont.) Street Railway will probably be requested to renew the tracks on King Street from James to Bay Street, on Margaret Street from King to Main Street and on Main to Locke Street, on Wentworth from King to Cumberland Avenue, King Street from Dundas Street to the McKittrick bridge, and Barton Street from Ottawa Street to Kenilworth Avenue. The railway committee has recommended to the City Council that application be made to the Railway Board for such improvements.

Dallas (Tex.) Railway will lay special passing switches and other special steel on the Belmont-Vickery line, making possible the operation of through cars from the business district to the end of the line. These have been shipped from Chicago, according to Richard Meriwether, vice-president and general manager. The steel is expected to be in Dallas by the middle of January and it is expected that through service on the Bryan Street line to these suburbs will be inaugurated early in February, as the special construction work will be done as soon as the steel arrives.

Trade Notes

W. C. Starkey, formerly chief engineer of the Ohio Brass Company, Mansfield, Ohio, has been named vice-president and directing engineer of the Stevenson Gear Company, Indianapolis, Ind.

Safety Car Devices Company has transferred its headquarters from St. Louis, Mo., to Wilmerding, Pa. S. G. Down, general sales manager at Wilmerding, has been elected president of the company to fill the vacancy caused by the resignation of C. P. Cass.

Westinghouse Air Brake Company, Wilmerding, Pa., has announced that Thomas A. McGinley, vice-president and general manager of the Duff Manufacturing Company, Pittsburgh, Pa., was recently elected to its board of directors. He succeeds his father, John R. McGinley, who resigned a short time ago.

Chain Belt Company, Milwaukee, Wis., has opened offices at 735 Ellicott Square, Buffalo, N. Y., and has appointed T. E. Cocker as district manager of that territory. Mr. Cocker for ten years was connected with the engineering department of the New York Central Railroad at Buffalo. He is a graduate of Rensselaer Polytechnic Institute.

Roller-Smith Company, 233 Broadway, New York, N. Y., has announced the appointment of O. I. Eberhardt, Board of Trade Building, Scranton, Pa., as a special representative in the counties of Bradford, Wayne, Wyoming, Luzerne and Lackawanna and parts of the counties of Carbon, Monroe and Schuylkill in the State of Pennsylvania. Mr. Eberhardt will handle the Roller-Smith Company's line of electrical instruments, electric meters and electric circuit breakers in that territory.

Railway Supply & Manufacturing Company, Cincinnati, Ohio, has increased its capital stock from $10,000 to $600,000. The company, previously a part of the Joseph Joseph Brothers Company and which was recently sold by that firm, has made the increase in view of the fact that it will operate independently. The company will continue to keep its headquarters at 1242 Harrison Avenue.

New Advertising Literature

Consolidated Car-Heating Company, Albany, N. Y., is distributing Bulletin No. 22, describing and illustrating all of their newest types of electric heaters for railway cars, offices, buildings and industrial purposes. Apparatus is produced for service on voltages ranging from 110 to 1,800 volts.

"Outspinning the Spider" is the title of a book written in a popular and understandable vein by John Kimberly Mumford, who has written a number of books on industrial subjects. It tells for the first time the history of wire-rope making in this country, for the most part as reflected in the growth of the John A. Roebling Sons Company where the industry began in 1840. The book relates in a vivid way the various processes used and the exacting care necessary in the manufacture of wire rope. Included among the uses to which it has been put are mentioned the construction of the Brooklyn Bridge and the wire-rope barrage laid down in the English Channel during the war.

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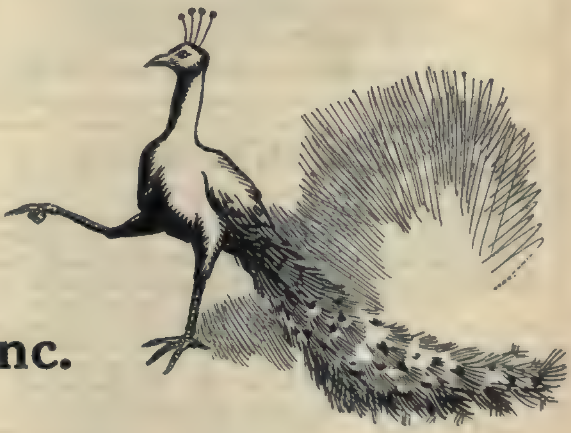

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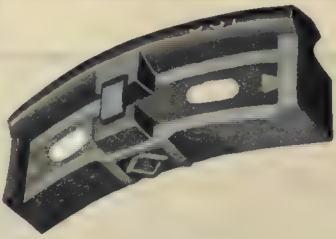

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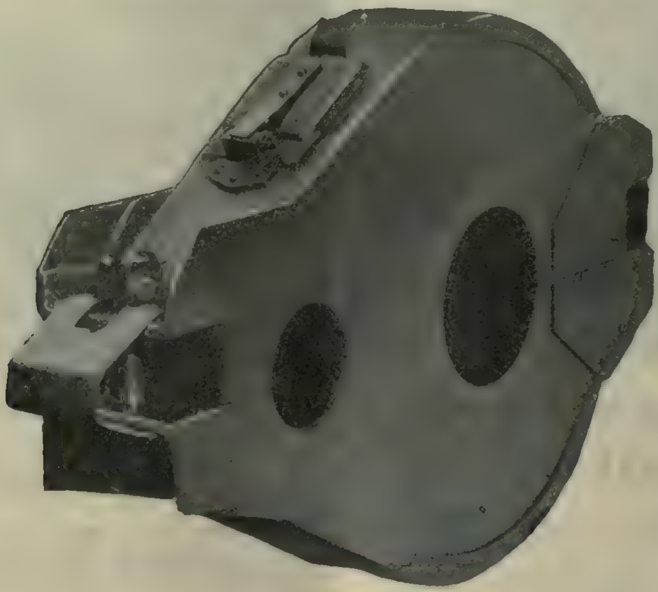

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In India the *serai,* or *mozaffer-khana,* is an institution in every large village. It is a sort of hotel which rivals the American country tavern in inconvenience and even surpasses the American road-house in promiscuity . . . et cetera.

It is a very primitive affair. For instance, if one desires heat he must needs build his own fire. Or if a broiled chop is fancied there is nothing to do but get it and cook it yourself. You go to the river for your bath and roll you your own.

Although the primitive is the rule in India instead of the exception, the more important commercial centers have been thoroughly modernized under British direction; and where motor power is utilized to turn the wheels of industry—there you will find Morganite Brushes prescribed by Morganite engineers in the Morganite way of *fitting the correct type of brush to the conditions governing the motor's operation.*

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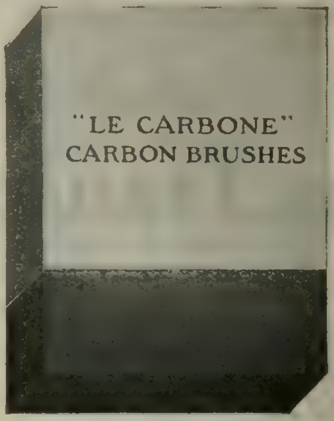

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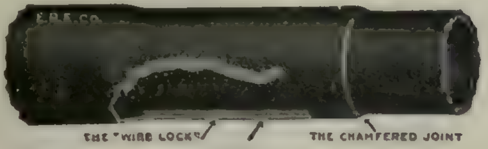

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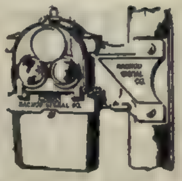
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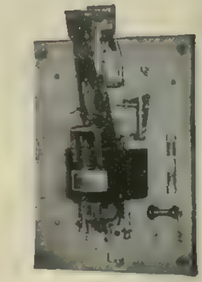

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Peirce Forged Steel Pins with Drawn Separable Thimbles
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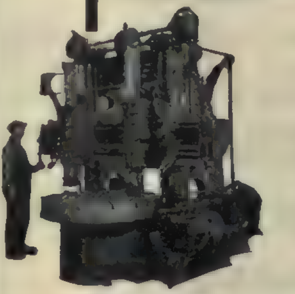

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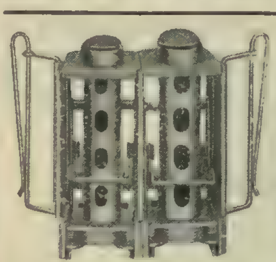

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Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

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Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

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have no bolts, nuts or screws, that can be removed from the outside. Let us tell you of other good features.

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AMERICAN means QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

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Samples and information gladly sent.

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WANTED: master mechanic on electric railway in Central West operating 80 cars, principally Birney safety type. Applicant must be competent to take full charge of shops and car barns and superintendence of all maintenance of equipment. In replying give full details of past experience and with what company. Also state salary expected. P-382, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

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INDUSTRIAL engineering, maintenance or construction. Ten years superivision on construction and maintenance of buildings, power plants and equipment. Seven years betterment work, on production, organization, appraisals, costs. Age 35. PW-374 Elec. Ry. Journal.

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Familiar with electric railway and transmission requirements. State age, education, experience and salary expected. AS-383, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

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A High Grade Experienced Salesman

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WANTED TO PURCHASE

100 HP. MOTOR

to operate at or about 850 r.p.m. Motor may be either 600 volts D. C. shunt wound or 2200 volts, 3 phase, 60 cycles, slip ring, A. C. type. It must be in perfect operating condition.

State best price and delivery.

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For Every Service

Railway Motors

Standardize Your Equipments at Minimum Cost

TRANSIT EQUIPMENT CO.
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2—300 KW. Stanley 3 phase, 25 cycle, 360 volts A.C., 600 volt D.C. speed 500 RPM. complete with suitable transformers, also panels.

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Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
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Axles
Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
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Babbitt Metal
More-Jones Br. & Metal Co.

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Brill Co., The J. G.
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Niles-Bement-Pond Co.
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American Steel & Wire Co.
Electric Service Sup. Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
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Barbour-Stockwell Co.
Bemis Car Truck Co.
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Columbia M. W. & M. I. Co.
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Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
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National Brake Co.
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Amer. Rattan & Reed Mfg. Co.

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General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
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Brush Holders
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Brill Co., The J. G.

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Electric Equipment Co.
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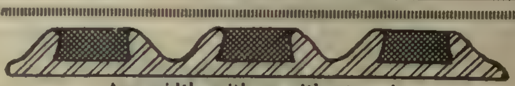

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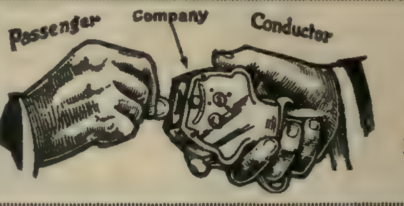

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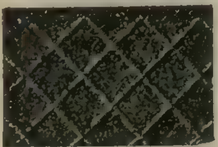

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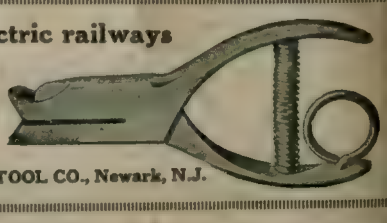

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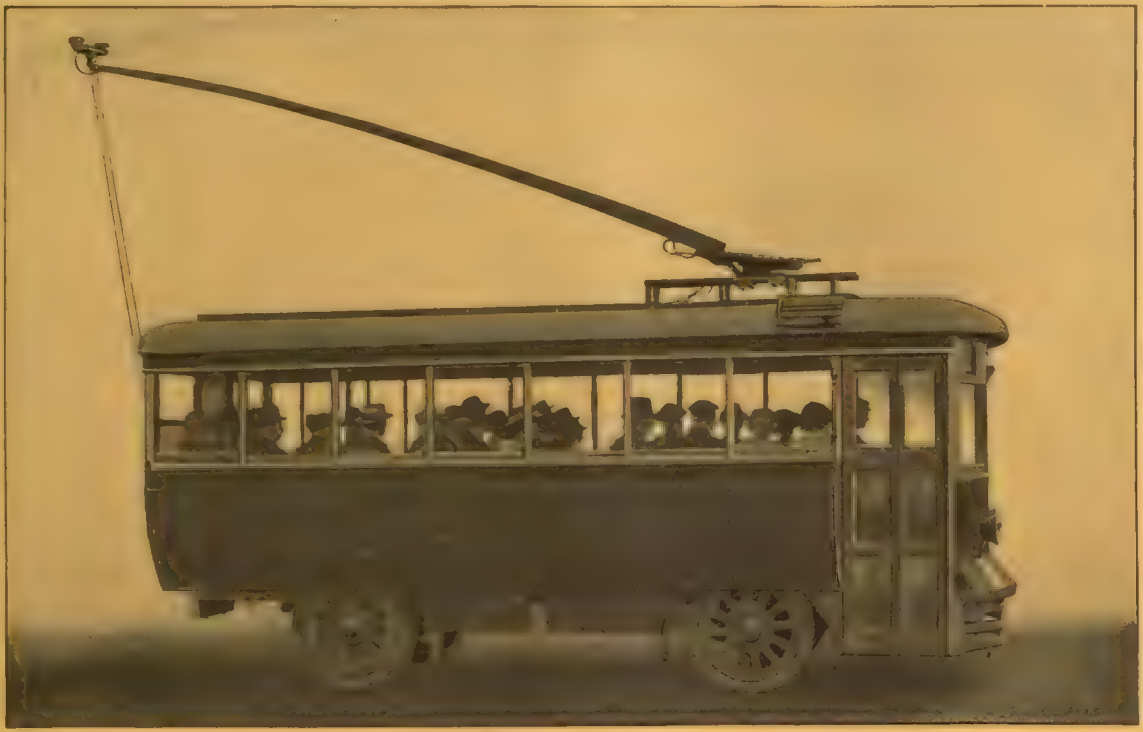

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The co-ordination of transportation under responsible management is the most efficient system, and unquestionably the electric railways are the logical organizations to furnish this unified service.

Where it is impossible for electric railways to extend their existing lines to serve outlying districts, the Brill "Rail-less" Car is the solution. Economically operated and conforming to present electric railway rolling stock, it can be quickly placed in service.

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Monthly Mechanical and Engineering Edition

ELECTRIC RAILWAY JOURNAL

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A Simple Statement of Facts on the First Cost and Quality of Paved Track

IF, in telling you about Steel Twin Tie Track, we found it necessary to claim *only* that it was a superior type of construction at a cost equal to or slightly higher than wood tie construction our task would be simplified.

But the facts require us to go further.

It is now eleven years since the first detailed costs were tabulated on one of our pioneer installations. The totals showed the job completed at a cost less than the wood tie construction previously used by that company. It had actually cost less but was it better track?

Time has been the judge. For eleven years that track has carried standard interurban equipment, singly and in two and three car trains on usual schedules and not one cent has been spent for maintenance, the track being today in its original state of smoothness.

In 1922 the first cost of this track divided by eleven years (its age) is 43c per foot. Each succeeding year will reduce the cost, already low. An individual case, to be sure, but in the aggregate—

Steel Twin Tie Track is best viewed in the light of users' opinion and their demonstration of that opinion in the way they buy.

It has been spoken of in editoral comment as "A type of track construction which constantly has been gaining headway"—Again in the columns of this journal it is the track which "showed a saving of $3.12 a single-track foot."

These comments are strengthened by the following significant showing on its steady and consistant adoption.

	1910	1921
Number of Users	2	104
Average Number of Ties per Order	109	2,851

The comparative mileage laid per year tripled in 1915 over 1914; doubled in 1916 over 1915 and increased 50% in 1920 over 1916.

Steel Twin Tie Tracks is approved, adaptable, permanent, economical, easy riding, quiet, joint supporting—but the essential point is that it will *save you money now and later.*

The unusual character of these facts challenges your attention. Act today. A short note will bring the complete details.

INTERNATIONAL STEEL TIE COMPANY
CLEVELAND

WESTINGHOUSE
ELECTRIC

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The World-Famed Slogan
"Safety First"

The safety and security of humanity is a national necessity. Any device fortifying safety is one of recognized importance and performs a great service.

Thus it is with line switch equipments for cars having drum controllers. Many roads, striving for maximum protection to both patrons and employes, regard auxiliary line switches and platform controllers as necessarily inseparable.

The use of a LINE SWITCH, mounted under the car floor in conjunction with platform controllers, removes all circuit breaking and overload operations from the car interior, and forms the basis for additional safety features, such as signals and automatic control of doors. It also lessens the wear on controller contacts and provides a more efficient and dependable circuit breaker protection for the main motors and power circuit.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION 1922

Type 801 Line Switch

Westinghouse

Vol. 59, *No.* 3 New York, January 21, 1922 ***Pages* 99-140**

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors **Henry H. Norris, Managing Editor**

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Increasing Transportation Demands Call for

Collective Action

EACH census of the United States indicates that ten to twenty million more people are added to our population. Each census indicates an even more rapid growth of the cities, when measured in the percentage of the whole, and the very great need of relating the business and social needs of the city with those of the country.

The problem of transporting these people in their daily life, under changing conditions of congestion and distribution, is in the large the problem which faces the men of the electric railway industry. To solve it, present methods must be developed and adapted to new uses; new methods must be found; but, above all, the industry as a whole must take collective action, and each man in the industry must feel his part and his responsibility in providing this necessary service to the ever increasing population of the nation. The work must be so done that the public will always have faith that the industry will meet its demands and make the proper advancement.

The *Electric Railway Journal* has this faith in the transportation industry, and in this faith it has developed. Recently, a new transportation agency — a new method — the bus, has developed, and this emphasizes more than ever the need of the right sort of collective action and study in this question. As a matter of fact another integral branch of the transportation industry has grown up around the use of the bus. A medium for this part of the industry was needed; the electric railways also needed adequately to be kept in touch with the developments and possibilities of this new agency. To do both these things and at the same time to provide a meeting place and a medium of expression for such collective action in the industry, *Bus Transportation* has been developed, supplementing the service of *Electric Railway Journal.* The first monthly issue of *Bus Transportation* has been published. Underlying the articles which deal with the management and operating problems of this particular form of providing transportation service is the general platform that only by united action and by co-ordinating the service of all forms of transportation can the transportation industry live up to its greatest opportunities.

This country has established a reputation, as Secretary of Commerce Hoover has said, for "efficient individual action," but we still have to learn the lesson of collective action. Collective action does not consist in dividing up among ten men the load carried by one, but in making it possible for each man to carry ten times as big a load.

Something of this thought and something of this spirit underlie the editorial and business program of the *Electric Railway Journal* and *Bus Transportation* for 1922.

Circulation of this Issue, 6,000.

Advertising Index—Alphabetical, 48; Classified, 44, 46; Searchlight Section, 43

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MAINTENANCE OF EQUIPMENT, after the equipment has been sold and placed in service, is regarded by the Westinghouse Traction Brake Company as a problem calling for close and constant co-operation between the manufacturer and the customer.

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To make it thoroughly safe, *insist* that it be *completely* equipped with the standard air brake and safety car control equipment of the Safety Car Devices Company.

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A short circuit of the electrical apparatus, piercing with the discharge, one of the steel drums fused the oil, spreading the fire to the entire 43 barrels. The intense heat generated, drew the temper of the steel crane and roof supports, causing them to bend, thereby pulling down the walls and roof. *The entire building and contents were a total loss.*

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Now this line foreman insists on O-B Cam Tips

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Now, the Superintendent says, that same foreman insists on getting O-B overhead material with Cam Tips.

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Your trolley work will be easier and your maintenance cheaper when you learn the advantage of O-B Cam Tips.

Pages 355, 356 and 364-377, Catalog No. 18.

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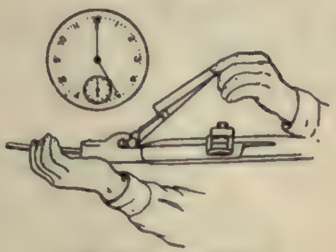

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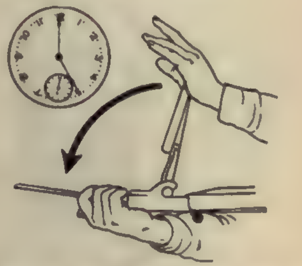
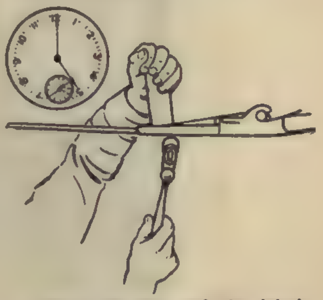


turn over and down on the wire—



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O-B ER Live Rigid Crossover (not illustrated) is similar to Type E. Made in 8°, 15°, 23°, 33°, 35° and 90° angles.

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O-B Type E Frog, adapted for high speed service and for use where several types of cars are operated over same line.—Patented.

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The Answer to Why, is WEAR!

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- Samson Cordage
- Air Valves
- Cord Connectors
- Trailer Connectors
- Automatic Door Signals
- Standard Trolley Harps
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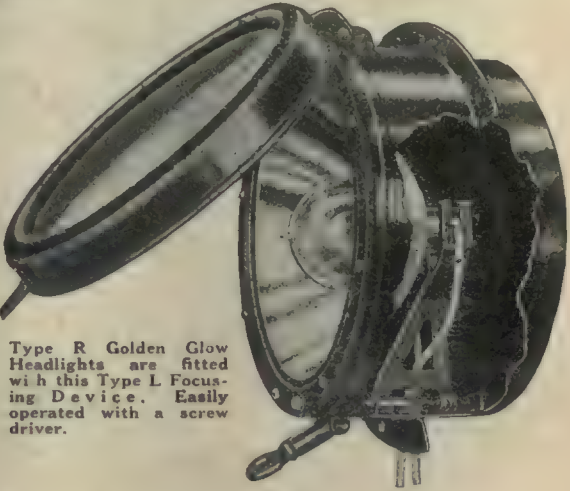

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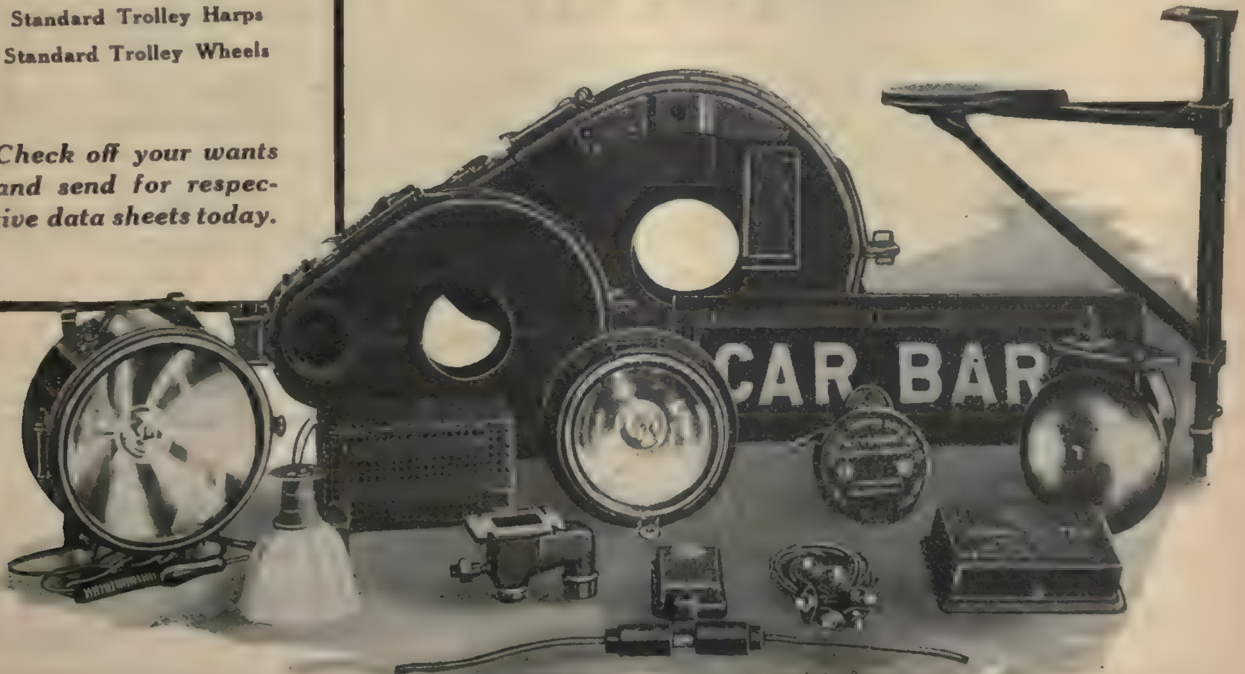

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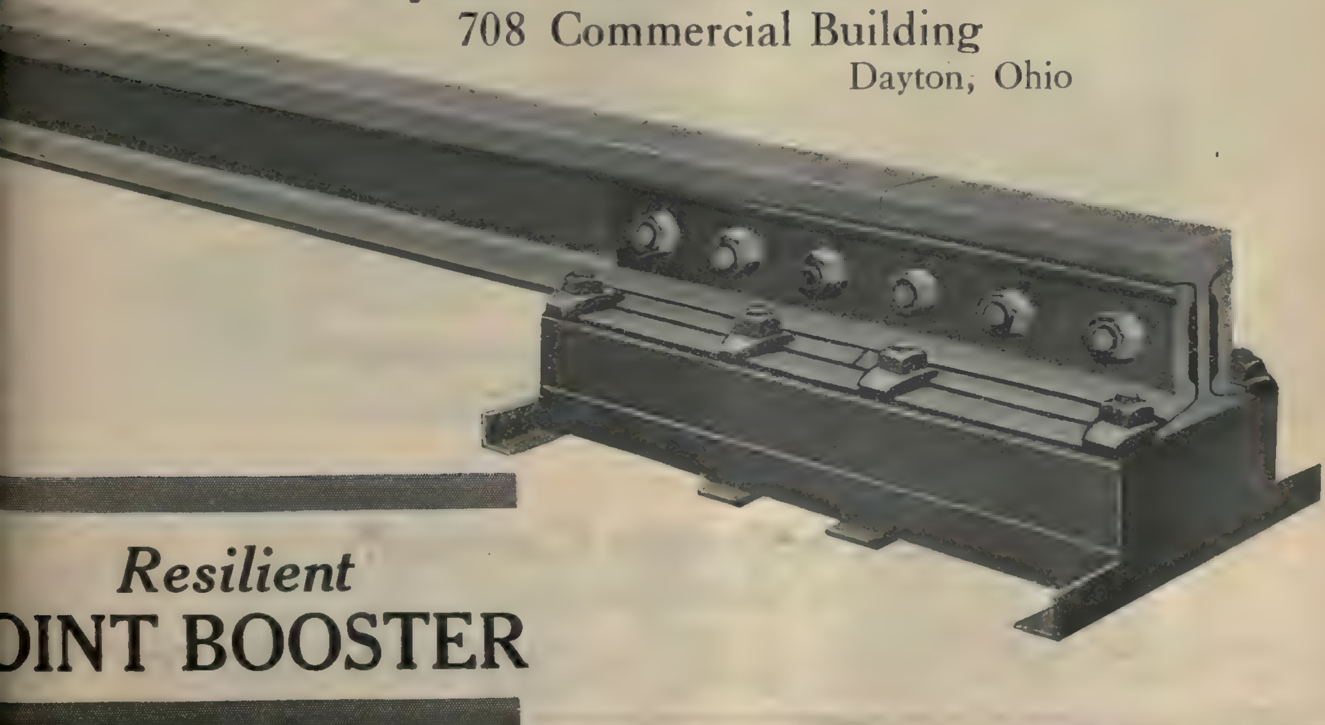

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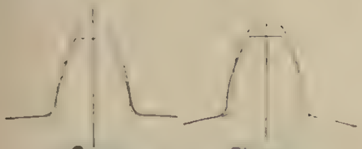

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Make the Superintendency of Equipment a Position of Greater Importance

MANY executives of electric railways are not sufficiently appreciative of the service which can be rendered by a real superintendent of equipment, as differentiated from the master mechanic, largely because they have never had the experience of having such an official on their properties. But the need for larger mental caliber in the mechanical department head has been forced upon the electric railways by the strenuous conditions under which they are now laboring. Men who produce results only by the rule of thumb will get results in the shop no longer, if indeed they ever did get adequate results. Real "concentrated thinking" is needed nowadays, combined with capacity to utilize all of the great mass of available information which can be applied in this line of work and knowledge as to where this information can be obtained.

It has been repeatedly pointed out in this connection that if men of the right type are to be secured and retained, the salary must be liberal and the opportunities for self-expression and development abundant. The superintendent of equipment must be admitted into the circle which surrounds the active managers of the property and his recommendations for improvements, even if these involve the spending of considerable sums of money, must be given respectful consideration.

The proper title for the head of the equipment department is "Superintendent of Equipment," except in special cases. Honorable as is the title "Master Mechanic," it does not fit the job which has been outlined above; the other suggests a position ranking with that of the superintendent of transportation, which is eminently fitting.

Master Mechanic or Mechanical Engineer for Superintendent of Equipment?

THE question which naturally arises in the mind of the manager who is looking for a real superintendent of equipment is where he is to get a man of the right type if he is not fortunate enough to have one already. His success with the property intrusted to him depends to a considerable degree upon the way in which he decides this matter. There is of course no one general answer possible, but he can analyze the qualities of the equipment superintendents of his acquaintance and decide for himself whether a trained engineer who is willing to dig in and learn the business practically or a natural mechanic who has made effective use of his brains while growing up in the shop gets the better results. It all depends on the men available. If there are working in the shop alert and capable young fellows who are willing to subject themselves to the discipline of study outside of shop hours, they are good superintendent timber. If school men can be had who are willing to buckle to, and work with hand and brain, they are promising also. The latter have the advantage in the opportunities which they have enjoyed for obtaining a broad outlook on life and work. Ultimately, it would seem, they will predominate, for if advanced school training is doing for young men what it is supposed to do, it is giving them that analytical capacity which is going to be needed more and more in this field as well as elsewhere. This capacity is in general much better developed in the atmosphere of the school than in that of the shop. But there will always be a place higher up for the ambitious mechanic who reasons about his work and who uses every available means to perfect himself in it.

In charge of equipment departments today a wide variety of types of men will be found. Some have been developed from mechanics right on the property; some have been similarly developed on other properties and installed ready-made; still others have had the advantages of college or industrial school training. Most of the men, however trained, are making good and the average of intelligence in equipment superintendencies is reasonably high. But the present incumbents cannot last forever, and a few should be set doing other things if their betters can be secured at such salaries as the railway managers think they can pay for this work. And even when existing conditions have been met with reasonable satisfaction, there remains the question: Where is the next generation of equipment superintendents to come from?

"Meet Me at the Monument,"

says President R. I. Todd

in his invitation to electric railway men to come to Indianapolis for the Mid-Year Meeting of Feb. 28. "Count on us, Mr. Todd," will be the response of every one who can possibly get to the meeting, the preliminary program of which augurs well for a meeting of pre-war proportions and spirit.

Encouragement of Thrift Profits Employee and Employer Alike

THE celebration of Benjamin Franklin's birthday anniversary by a country-wide thrift campaign not only honors the memory of a thrifty patriot, but tends toward stability in industry. Many electric railways have taken a prominent part in encouraging thrift among their employees. Their efforts succeed best when they explain frankly that, as employers, they themselves will benefit because men and women with money ahead are better workers than those who live from hand to mouth. At the same time, they can also point out that in building up a satisfied, effective personnel, they are benefiting the employees individually even more than they are profiting themselves. Everybody but the sorehead is satisfied with the results of an energetic intelligent thrift campaign.

There is one great accomplishment which successive thrift campaigns should eventually bring about. They should make saving respectable and popular, which it is not always at present. The present wasteful habits of Americans generally are due to lack of imagination and lack of inherited and inculcated carefulness. The negro who, when asked if he wished to earn a quarter, said "No, suh, I'se got a quahtah," has many prototypes in more intelligent circles. Lack of imagination hinders the thrift movement, because without the ability to visualize a definite purpose for saving, an individual cannot be convinced of the importance of saving. As for the lack of frugality, a virtue so common in Frenchmen, Scotchmen and other Europeans, this is largely due to the ease with which the necessities of life are earned in this country.

About all that an electric railway management can do to promote thrift locally is to appeal to the imagination of employees and to furnish simple means for saving and investing money. If the prospect of comfort for the individual and his dependents, or the fear of poverty, will not bring results, only grinding poverty itself will do the trick. It is to be hoped that actual suffering will not be necessary before the rank and file of Americans learn the lesson of thrift.

Railway Engineers Should Understand How Girder Rails Are Made

ELECTRIC railway men are apt to accept as a matter of course the many manufactured products which are used in their industry, giving but little thought to the processes through which the raw materials must pass before the products reach the comparatively perfect and finished state in which they receive them. One of these products is the girder rail, which has become so essential as a part of the track construction in many of the larger cities.

The evolution of the girder rail, from the crude makeshifts of the early days to the remarkably uniform and well-finished product of today, has been a matter of considerable wonder to those who have followed the many improvements both in design and in manufacturing methods which have been accomplished. These have centered in the greatly increased depth of section over the early rails; the methods of forming the groove; the maintenance of uniformity of the fishing section, and the generally close conformity of the entire rail to the template section.

The thin webs and bases, combined with the unbalanced distribution of metal between the head and the base, have made the manufacture of girder rails much more difficult than that of ordinary standard T-rails. The task of forming the groove so that it shall conform to template with a reasonable degree of accuracy has been a source of considerable trouble, but is now being performed with a marked degree of success. This has been accomplished through the introduction of the vertical side-roll, or idler-roll as it is frequently called. The use of this roll is one of the principal features which differentiate the processes of rolling girder rails and ordinary T-rails. However, the whole procedure, whereby the massive ingots, always at very high heats, are manipulated, requiring ingenious mechanical contrivances, and are finally reduced by many successive steps to the comparatively small cross-section of the rail, is a fine tribute to the inventive genius of the steel manufacturers.

The article by R. C. Cram on another page of this issue has been prepared particularly to direct attention to the progress that has been made in girder rail manufacture and to encourage the increased use of association standard girder rails because increased use will ultimately produce a reduction in cost of such rails. In fact, it is understood that the adoption of the association standard by one large purchaser recently did actually yield a substantial reduction in cost. Nevertheless, there are inherent manufacturing features which will necessarily make a price disparity between girder rails and low T-rails, and all rail users should understand them.

Can Stockholders' Losses Due to Regulation Be Recovered?

DOLLAR gas, which means a reduction from $1.15, goes into effect in Chicago on Feb. 1 if the order of the Illinois Commerce Commission is carried out, but Samuel Insull is to appeal from the order and instigate a friendly suit to determine whether a utility cannot maintain a profitable rate until it has been able to recoup the losses to stockholders caused by failure of the commission to grant an increase in rates when it was needed and applied for.

The gas company recently declared its first dividend to be paid since August, 1917. The new gas rate is scarcely sufficient to pay the allowable current dividend and affords no possibility of making up any of the losses in the last three years. It was not until June, 1920, that the company succeeded in getting an increase in its rate from 85 cents to $1.15, and costs meantime had risen to such an extent that not only were the shareholders' dividends absorbed but the credit of the company was seriously impaired. During these four "dividendless" years there was actual confiscation of the property, for the benefit of the customers, to the extent that the property owners' returns and surplus were not earned. Had adequate changes in rates been authorized when warranted, the stockholders would have received that to which the law recognizes they are entitled. Mr. Insull estimates that these losses amount to $12,000,000.

This case will be of greatest interest to utility operators because if won it would set up a precedent of very far-reaching importance in the problem of re-establishing the credit of the utilities generally. There is precedent in commission action for allowances of this kind, as when the Tennessee Public Utilities Commission about a year ago allowed a higher rate for gas to the Nashville Gas & Heating Company than was otherwise warranted so as to repay the company for losses sustained through too low a previous rate. Mr. Insull is endeavoring to secure judicial sanction in Illinois for this policy.

This seems an eminently logical position because the earnings of a utility are under constant supervision by the commission, which is usually very prompt in reducing rates if any tendency is observed toward more than the maximum allowance. Hence the company should not be obliged to bear the loss caused by a failure of the commission to raise rates when they are too low, either through inability to reach a decision promptly or through error in judgment.

Mr. Insull will also seek to establish that the income tax should be admitted as an item of operating expense and that the profits of a subsidiary company (non-utility) should accrue to the benefit of the stockholders and not the consumers. These points also mean much to the utilities.

Order Based on Conjecture Brings Court Rebuke

"CRITICISM should be fortified with convincing evidence when charges are made of inefficient and wasteful management." This pointed rebuke to the Illinois Commerce Commission was contained in the decision of two judges of the United States District Court in sustaining an injunction against enforcement of a 5-cent fare order on the Chicago Surface Lines. This decision was outlined in last week's issue. The 5-cent fare ruling of the commission had been discounted in advance as the mere carrying out of a campaign pledge of the new State administration. The opinion of the federal judges was therefore no surprise to those familiar with the Chicago situation, though many doubted that the commission would have the audacity so to ignore the law and the evidence. The court finding means, in brief, that confiscation of property will not be tolerated and that a rate reduction ordered arbitrarily without due investigation of conditions of the utility in question cannot be approved.

Suggested changes based on "conjecture and opinion" will not hold, said the court. "Orderly, rational and legal methods of procedure" must be followed in fixing rates, though the court seemingly tried to find an excuse for the action of the commission in its statement that a "commission will always be forgiven if its enthusiasm (in the interest of the people) leads it to incidental legal excesses. It cannot, however, act arbitrarily to force its views without trial." Fare orders must be based on evidence or sustaining truths, and where the record on review before the court shows that the plaintiff's operating costs compare favorably with those of other companies of like nature, it cannot fairly be accused of inefficiency.

An interesting angle of the Chicago Surface Lines case was the attempt of the commission to regulate the service by fixing the rates of fare charged therefor. The court held this to be an improper exercise of authority, saying the commission should have ordered whatever changes in its opinion were proper and suggested the rate after the various reforms had been found possible of execution. The mere opinion of a commission that a certain kind of medicine will be good for the patient cannot be accepted without proof.

The federal judges also scorned the contention of the city's lawyers that a minor return to the stockholders of today is enough because their predecessors secured large returns. The court made clear that there is no connection between past and present, as presumably the more fortunate investors of earlier years have since unloaded their holdings and the less fortunate present holders should not be made to suffer.

Similar treatment was given by the court to the suggestion that a large saving in operating expenses should be made by eliminating the provision for renewals and depreciation. "The right to set aside a depreciation fund is a property right created for the benefit of the complainants (railways) and cannot be taken away by the state without their consent or due compensation made therefor," said the judges. This, too, is sound common sense.

The decision in the Surface Lines case may serve a good purpose as an object lesson for "political" commissions everywhere, and locally in steering the members of the new Illinois Commerce Commission into proper channels of reasoning. They have already discovered—if they did not know before—that investors in public utilities have their property rights which must be respected. The way is not foreclosed to reduction of rates if these rates are found to be excessive, but the new rates must not be punitive nor can it be a matter of unprincipled political caprice. Sanction of a confiscatory rate would harm the public dependent upon the utility for service as well as the investor whose money is at stake.

Utility commissions have their useful functions, but it is good to note that the federal court was prompt to recognize the abuse of authority and properly rebuke the offenders. In its more recent workings, the commission has been noticeably more cautious and has taken pains to have its utterances well grounded.

No Immunity for the Railway Companies

AN ELECTRIC railway company cannot turn state's evidence, run to its mother, hide its head in the sand or do the other things erring animals do to escape punishment. No, every error of a public utility results in a sentence to the public pillory. It is difficult to forgive an intangible inhuman mechanism that depends on public donations for support when it gets into trouble. It has no smile or laughing eyes or pleading voice to create sympathy and it may create a public sentiment that is "sharper than a serpent's tooth" when angered.

Public utilities have excellent executives, and they seldom if ever purposely attempt to anger the public, but who can gage the mob spirit? Errors in policy will always occur and it is absolutely essential that the initial attitude of the public should be favorable and not unfavorable to the utility.

If the personality of the company could be focussed into the form of a charming young lady, what public jury would convict? If tears, beguiling eyes, seductive form and pleading words could only represent a street railway, what miracles would occur? Or if only the pre-war "Bill Kaiser" could personify the utility, what a relief it would be to have the public shouting "the King can do no wrong." But why dream of the impossible and of the past when a real crisis is at hand?

But the railways can do things to help swing the public to them; they can merge the company personality into one man, who, above and beyond all other duties, must be one of the mob and must interpret for and to it all items in connection with street railways. Few street railways have executives who have the personality or the time to devote themselves to public relations and most permit statements to reach the public from two or more sources in the organization. This is the reason for the appointment of an official whose principal duty is to see that the public is satisfied with the service, whether his title is manager of public relations, sales manager or what not. Where this work can be done by the chief executive officer it is better, but that is not essential. Of course it takes brains, personality and a frank, straightforward policy to get away with such a job, but it is a necessary move if the public is to be kept in a sympathetic frame of mind.

Such a man can do more to "sell" the company than a million pages of advertising. All most railways need is a good salesman and a showroom instead of so many men and women who are so much engrossed in their own duties that they are almost inaccessible and seem ofttimes quite unapproachable.

Rolling Girder Rails

The Author Describes the Various Rolling Mill Processes Incidental to Rolling Girder Rails—Essential Difference in Rolling T-Rails and Girder Rails Discussed — Some Reasons Given for Cost Differences and Recent Developments Outlined

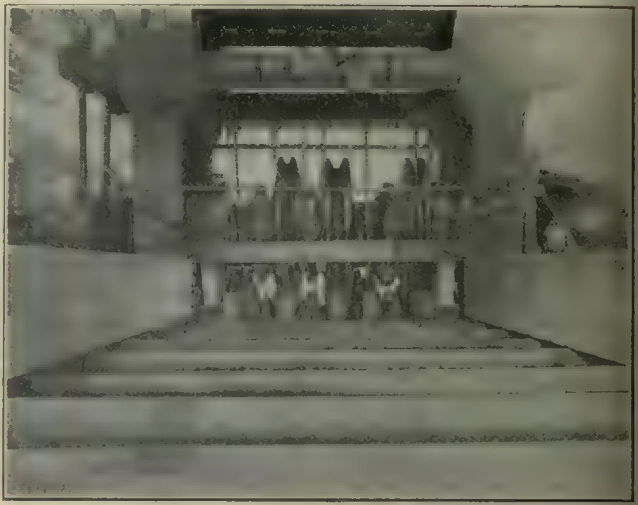
By R. C. Cram
Engineer Surface Roadway Brooklyn (N. Y.) Rapid Transit Company

IN A PREVIOUS article on the history and development of electric railway rails the writer attempted to outline the theory and practice which led up to the rails as we know them today. The subject of rails is so broad that there remain quite a few matters relating to them which will bear discussion and some of them will be treated in this article.

A knowledge of the methods of manufacture of any material is always useful when an attempt is made to apply that material to a definite service. Hence an outline of the manufacturing procedure in rails should be of some interest.

It may not be out of place in discussing steel rails to refresh our minds as to what steel is. We are very likely to forget the fact that it is really refined iron because most chemical analyses of steels neglect to include the iron content and give only the percentages of the other or remaining elements. Steel contains usually about 98 per cent iron, with the remaining 2 per cent divided principally among the elements of carbon, manganese, silicon, phosphorus and sulphur. Occasionally traces of copper and arsenic may be present. With the exception of iron, carbon may be considered the most important element.

Principally because varying grades or degrees of hardness and ductility are obtained by varying the proportions of the carbon, manganese, silicon and phosphorus, the iron content is omitted and rather taken for granted in rail-steel analyses. Similarly, by adding certain alloys such as manganese, vanadium, chromium or nickel the properties of the steel may be changed, and steels to which these alloys have been purposely added are called alloy steels and take their names from the particular element thus added, viz., vanadium steel, chromium steel, silicon steel, nickel steel and manganese steel. These terms serve to distinguish the steel from ordinary or carbon steel, from which rails are usually rolled.



In These First Roughing Rolls the Rails Get Their Preliminary Formation. (Taken from Point 4a, Fig. 1)

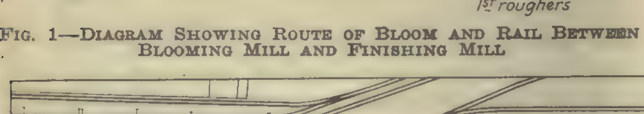

Finisher
9
8a
7a
8
7
6a
6
5
4
5a
9a
4a
No3
No2
No1
Locations from which photographs of individual passes were taken.
Locations from which assembled rolls and housings were taken.
2nd roughers
1st roughers

Fig. 1—Diagram Showing Route of Bloom and Rail Between Blooming Mill and Finishing Mill

The use of alloy steels for street railway rails has never gained much favor, except in the case of manganese steel, which has obtained a wide use for special trackwork wherein the rails are subjected to extraordinary wear. Titanium treated steel has been used to a considerable extent, but titanium is not considered as an alloy since it is almost impossible to find it in an analysis of finished rail steel to which it has been added. As a rule, alloy steels are more expensive than ordinary rail steel, and this fact, combined with the doubtful value of the results so far obtained from their use, has prevented their general adoption.

The whole process of making the rail steel cannot be

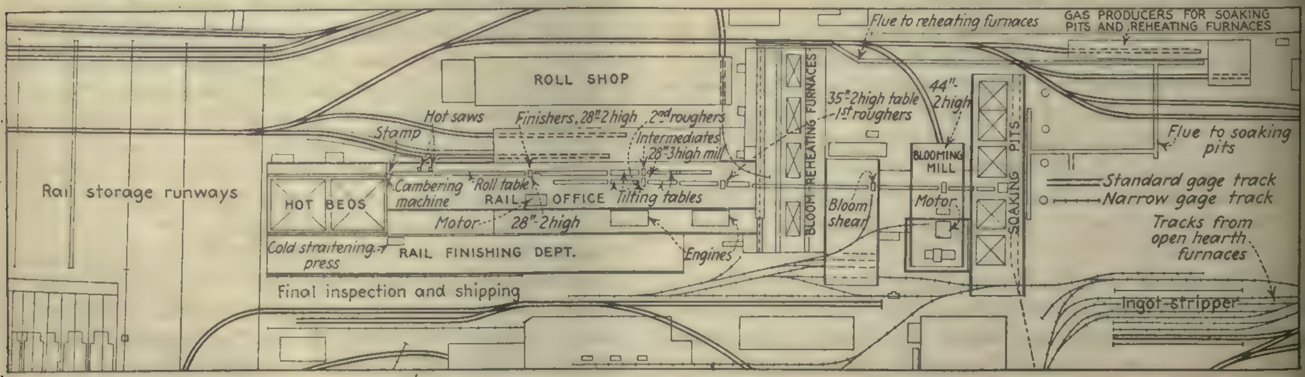
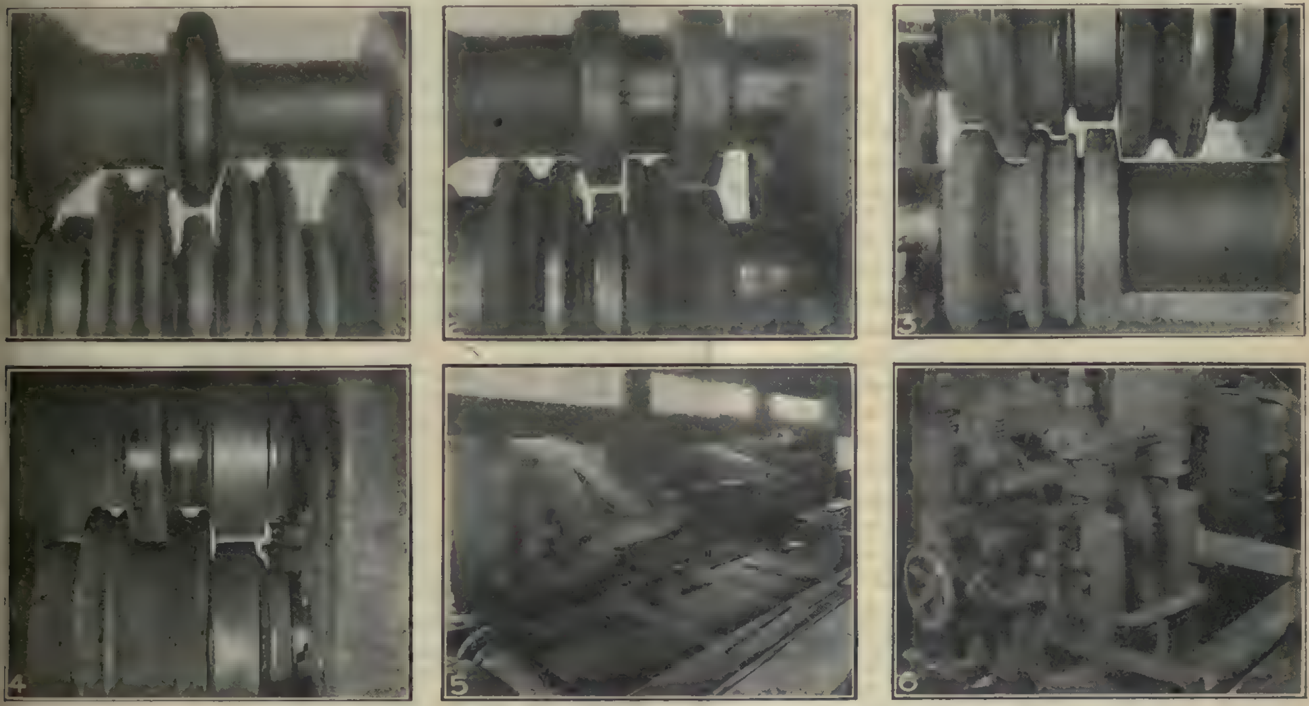


Fig. 2—General Layout of Typical Rail Mill, Scale Approximately 335 Ft. to the Inch

described within the limits of this article, which aims principally to describe rolling mill processes rather than steel making. It is now generally known that rails are made principally of open-hearth steel, in contrast to earlier practice of using bessemer steel. This change has come about through the increasing scarcity of low-phosphorus ores and because the bessemer process of steel making does not eliminate phosphorus. Phosphorus is one of the most troublesome elements because it hardens steel more rapidly than does either carbon or silicon and it renders steel brittle by increasing the hardness and decreasing the toughness. High phosphorus in conjunction with high carbon renders steel "cold short," which means that it is brittle when cold.

ELEMENTS OF A ROLLING MILL

Rails are produced in rolling mills. Rolling is the operation of reducing the section of pieces of metal by passing them between revolving cylinders called rolls.



SOME OF THE ROLLING-MILL EQUIPMENT USED IN MAKING RAILS

No. 1—Assembled rolls for fifth pass in second roughers. Tram beginning to take form. (Taken from point 5a, Fig. 1.)
No. 2—Intermediate rolls in which tram and head are shaped further. (Taken from point 6a, Fig. 1.)
No. 3—Eighth pass through intermediate rolls, in which head is beveled and base shaped further. (Taken from point 7a, Fig. 1.)
No. 4—Finishing rolls, ninth pass, in which groove is formed by idler roll and maker's imprint is added. (Taken from point 8a, Fig. 1.)
No. 5—Hot saws by means of which rails are cut to length.
No. 6—Numbering machine which stamps heat numbers on rail base.

A rolling mill consists essentially of the rolls set in a framework, called a "housing," and connected with an engine by pinions and spindles. Rolls are almost always made of steel cast to rough shape and then turned down to exact size. The preparation of a set of rolls is a costly process. However, cast iron rolls are generally used for the finishing rolls. Rolls and housings are shown in the accompanying illustrations. The enormous size of some rolls is indicated in the several views. A set of rolls and their housing is called a "stand" and two or more stands connected together a "train."

The rails pass from one stand to another upon roll tables which are shown in one of the illustrations. These tables consist of long series of rolls which are operated by power and the rails pass on top of them from one stand to another in the rolling train. The tilting tables used with three-high mills are so arranged that they may move laterally as well as vertically in order that the rails may be transferred from pass to pass without loss of time.

PREPARING INGOTS FOR ROLLING

The pig iron produced by the refining of iron ores is mixed with scrap, melted and further refined in open hearth furnaces of either the stationary or tilting types. This refined product of the open hearth furnaces, which is now steel, is tapped (or drawn) into ladles, which are conveyed by a traveling crane away from the furnace and the metal is teemed (poured) into ingot molds. A "heat" is the particular furnace charge from which the ingots are poured and from two to seven ingots are poured from a bessemer furnace, while twenty or more are obtained from open-hearth furnaces. The "heat" number of the ingots is always marked on the rails, while still hot, by a stamping machine, shown in an accompanying illustration. This is done just after the rails are sawed to length for the purpose of identification. As soon as the metal has cooled sufficiently to solidify, the ingot is removed or "stripped" from the mold by stripping machines (strippers) and placed in a "soaking pit," which is a vertical heating furnace whose top is below the floor level, where it is kept at a temperature of from 2,100 to 2,200 deg. F. This is done in order to allow the temperature of the ingot to become equalized. The ingots are kept in a vertical position in the soaking pits in order to have the "pipe" remain at the top. The ingots range in size from 13 x 19 in. to 23 x 29 in. at the bottom and the height varies from 67 to 82 in. The height of the ingot is varied (poured down) when the metal is teemed into the mold to suit the rail that is to be rolled. Ingots for girder rails weigh about 9,800 lb.

The treatment which the metal gets during the manu-

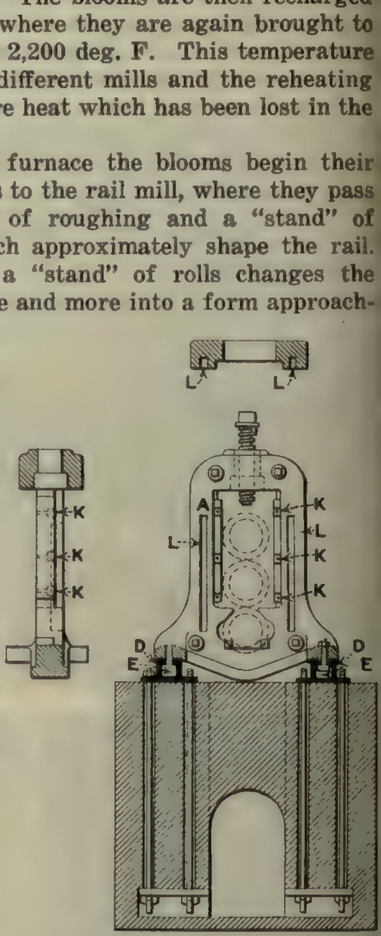
THREE-HIGH ROUGHERS AND INTERMEDIATE ROLLS—DRIVING ENGINES AND GEARING AT LEFT, ROLL TABLES IN FOREGROUND AND BACKGROUND. (TAKEN FROM POINT 9A, FIG. 1)

facturing process is thought by many to be of even greater importance than the chemical composition. Dr. C. B. Dudley stated in a report to the Iron and Steel Institute in 1890 that sound ingots were of the utmost importance, and the more recent research work by the metallurgists of the American Railway Engineering Association, the Bureau of Standards and the Interstate Commerce Commission has been directed toward the improvement of practices which will insure the production of sound ingots. Undoubtedly the most serious defects in rails develop from this source. Steel contains impurities which solidify at lower temperatures than metallic iron. The impurities tend gradually to segregate from the iron and concentrate in the hottest parts of the ingot, which are at the center and top. Unsoundness may also be due to improper mixing of the molten metal. While it is possible to produce sound ingots, the ordinary method of casting them usually results in a large proportion of unsound metal at the top which often extends all through it. When this happens, the unsound portions are apt to get into the finished rails.

When needed, the ingot is taken from the soaking pit, cropped (cut) by heavy gear-driven shears to discard unsound metal and rolled into blooms (large sized bars), in a blooming mill, where by successive passes through blooming rolls it is reduced to a shape section similar to that required for I-beams and channels. This section has an area about equal to an 8-in. x 8-in. square and the blooms range from 15 to 24 ft. in length. The bar or bloom as rolled is cut or cropped sufficiently to remove all unsound material and is then cut into several blooms whose lengths are determined by the length and weight of the rail to be rolled. The blooms are then recharged in reheating furnaces, where they are again brought to a temperature of about 2,200 deg. F. This temperature varies somewhat with different mills and the reheating is done mainly to restore heat which has been lost in the blooming process.

HOT BEDS WHERE RAILS ARE ALLOWED TO COOL AND STRAIGHTEN—ROLL TABLE AT RIGHT

From the reheating furnace the blooms begin their travel on the roll tables to the rail mill, where they pass through two "stands" of roughing and a "stand" of intermediate rolls which approximately shape the rail. Each "pass" through a "stand" of rolls changes the shape of the bloom more and more into a form approaching that of the finished rail. From the intermediate rolls the rail goes to the finishing rolls (finishing stand), which give the rail its final or finished section. These rolls also form the raised markings such as the maker's name, date, weight and section number upon the rails which appear slightly raised in letters and figures upon the web. Until recently it was believed that the finishing temperatures affected the mechanical properties of the rail, but experiments have proved that such temperatures have little influence on the wear of rails. A more important factor is to have the rail head secure a maximum amount of work during rolling.



TYPICAL ROLL HOUSING FOR THREE-HIGH MILL

A, housing casting; *DD*, base rails; *EE*, slots for boltheads; *K* and *L* serve to identify points on section drawings.

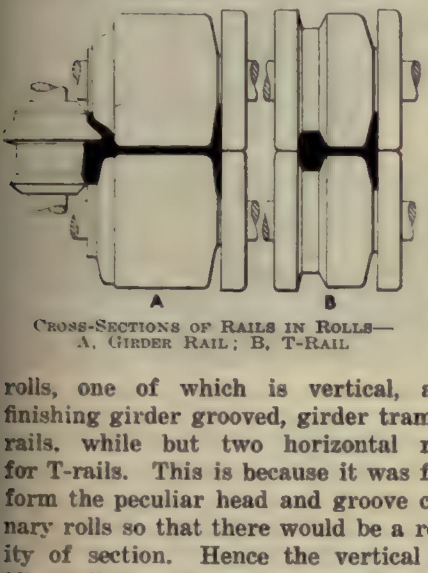
The rail then goes to the "hot" saws (so called because they cut the hot rails and to distinguish these saws from "cold" saws used for cutting cold metals), where it is cut usually to a length of 62 ft. as 30-ft. lengths are now seldom specified for girder rails. Girder guard rails, however, are still cut to 30 ft., principally to facilitate their later bending for use in curves. The temperature of the rail has been reduced to about 1,700 deg. F. by the time it reached the saws. The hot saws are shown in one of the illustrations.

The hot rails now go on to the stamping machine, where the heat numbers are put on the base at one end and clear of the space occupied by joint plates. Following this operation, the rail passes to the cambering machine, where it is given a camber of 6 in. or more, depending upon the distribution of the metal in cross-section. Cambering is a very important operation. After this the rail goes to the cooling beds (hot beds) shown in the illustration, when the camber disappears as the rail cools to normal temperature. When cooled the rail goes to the cold-straightening press, where any kinks are taken out. Girder rails sometimes receive severe treatment in this press and it is believed that they receive a test here which serves about as well as the drop test in the determination of most of the physical properties. Very few girder rails ever fail in the drop test if they have successfully passed the cold-straightening press.

The rail then goes to the ending machine, where the ends are made true. Following this the bolt holes and tie-rod holes are drilled and the rail is then placed on the inspection and shipping platform.

GIRDER GROOVED RAILS REQUIRE VERTICAL ROLLS

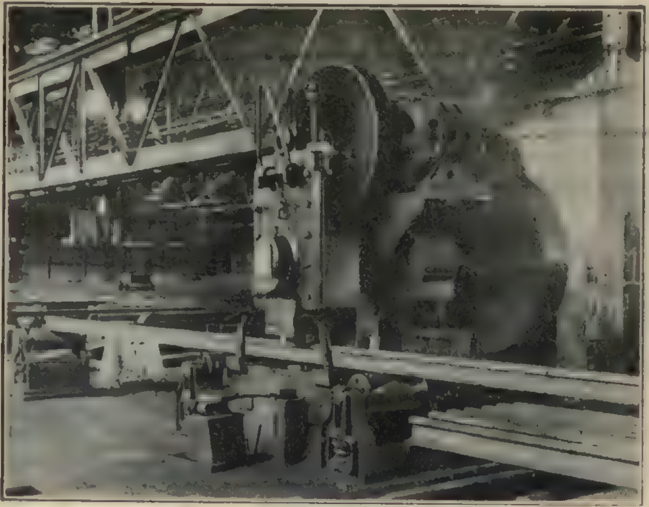
There are but two mills in this country which are equipped to roll girder grooved and girder guard rails. The process in the rail mill proper is somewhat different from that for rolling standard (T-rail) sections. Girder rails may be rolled in what is called a "two-high" reversing mill, where the rails are transferred from one pass to another, the rotation of the rolls being reversed between passes. "Three-high" mills are also used, in which case there are three rolls in a stand, as shown in one of the illustrations. After passage between the two lower of the three rolls the rails are raised on a "tilting table" and passed between the two upper rolls, the middle rolls being used in common for each pass. In the three-high mill it is not necessary to use reversing engines. It will be noted from an accompanying illustration that three rolls, one of which is vertical, are necessary for finishing girder grooved, girder tram and girder guard rails, while but two horizontal rolls are required for T-rails. This is because it was found impossible to form the peculiar head and groove contours with ordinary rolls so that there would be a reasonable uniformity of section. Hence the vertical roll (side roll or idler roll) was introduced, and this successfully solved the problem, so that a remarkable conformity with the template is now obtained.



CROSS-SECTIONS OF RAILS IN ROLLS—A, GIRDER RAIL; B, T-RAIL

There are two friction-driven vertical rolls used, one in the final pass at one end of the horizontal rolls and one in the preceding or leader pass at the other end of the horizontal rolls. It would be impossible to roll some sections now required without these vertical rolls, which are principally for forming the tram or groove. One rail mill forms the groove by rolling a lip projecting about at right angles to the rail and bending it up to proper form in the final passes. The other mill forms the groove by constantly rolling the head and lip in a mass and forming the groove by pressing it out (or "guttering" as it is called) by means of the idler roll in the final passes. The first method is a bending and forming operation, while the second is more of a pressing operation. Both rail mills use the first method for forming guard rail sections.

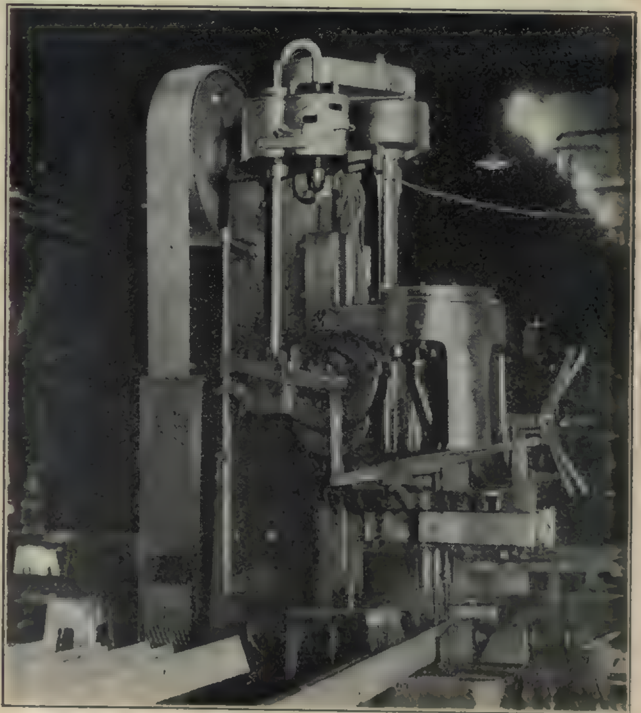
There are a number of reasons why girder rails cost more than ordinary standard section (low-T) rails. More rolls are required and nearly all of these must be changed, for each change in section, from the start of the blooming mill to the finishing rolls. This takes time and the rolls are expensive. Tonnages for each section are usually small and the "run" or time expended is comparatively short, entailing frequent shut-downs for roll changes. It is said that the production of a rail mill working on girder rails is 50 per cent less than when working on standard section (low-T) rails.



COLD-STRAIGHTENING PRESS, WHERE THE LAST KINKS ARE REMOVED FROM THE RAILS—HOT BEDS IN THE BACKGROUND

Girder rails require special shape blooming rolls, while standard section (T-rails) rails are rolled from ordinary square blooms and the same set of blooming rolls may be used for many different T-rail sections. Thus the blooming mill may be run at 100 per cent capacity, which is not so when roll changes are required for girder rails. It is necessary to reheat the blooms for girder rails, while low T-rails are usually rolled direct from the initial heat of the ingot.

Furthermore, the entering pass is slower on the special shape blooms, which reduces the capacity of the blooming mill. Girder rails are always rolled in 60-ft. lengths, which increases costs for finishing, straighten-

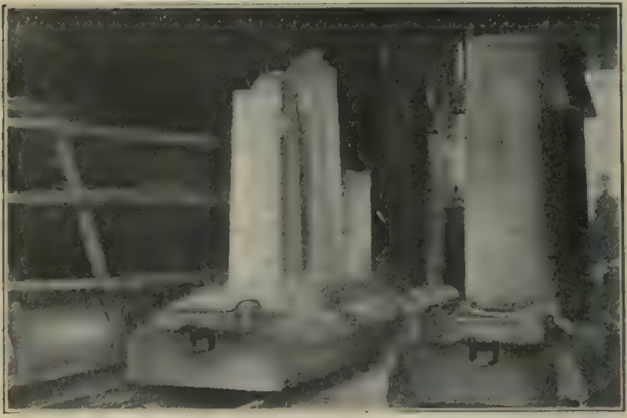


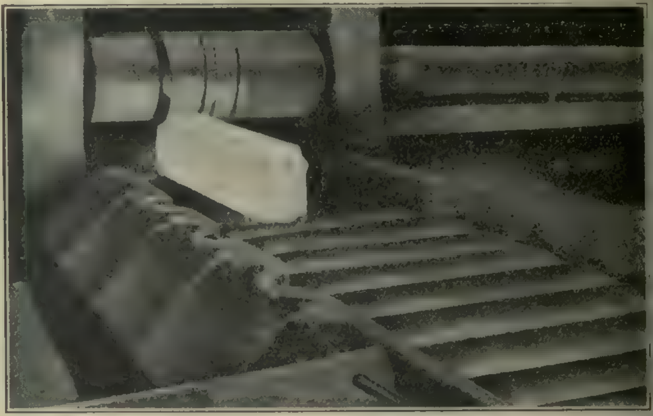
MULTIPLE-SPINDLE MACHINE FOR DRILLING BOLT HOLES ing and handling, and this length causes greater loss in scrap rails due to short lengths caused by minimum lengths of 40 ft. allowed by specifications. All girder rails have their ends milled square in an ending machine and they are frequently drilled for tie rods, both of which add further to the cost. Of the foregoing items it is stated that the 60-ft. length alone is responsible for a $5 cost increase over the cost for 30-ft. rails even when 60-ft. lengths are required for low T-rails.

The great variety in number of sections still called for by the street railways, combined with the unequal distribution of metal between head and base; the peculiar head and groove contours and the comparatively thin webs and bases are other factors which contribute in no small measure to the higher cost of manufacture of girder rails.

RECENT DEVELOPMENTS IN MANUFACTURING PROCESSES

In Great Britain there has been a considerable use of silicon steel or "Sandberg" silicon rails for tramway purposes. This steel is made by the bessemer process and it is high in silicon content, which ranges at about 0.315 per cent. Sandberg has introduced a new process whereby the steel is cooled by air jets through the critical range in temperatures, producing a sorbitic structure. It is claimed that an increased durability of from 100 to 200 per cent has been shown in rails of this kind during a test period of one year, and that so far no indications of corrugation are found. The Bethlehem Steel Company is now introducing this process in this country.


INGOTS AND INGOT MOLDS ON WAY TO AND FROM STRIPPER


INCANDESCENT INGOT ENTERING FIRST PASS IN BLOOMING ROLLS

The Sandberg people also introduced a process (called "in-situ") for heat treating rail heads in tracks in place for the purpose of hardening them and increasing their life. It is stated that the results of this process as used on the Croyden Tramways in England for a year and a half showed no signs of corrugation. A similar process for hardening rails in special trackwork has been tried in San Francisco.

Another manufacturing improvement of note is the so-called deseaming process introduced by the Lackawanna Steel Company. By means of a specially designed milling machine the comparatively soft surface metal is removed as a part of the movement of the rails through the rolling trains, leaving the harder interior metal for the final rolling passes and eliminating "skin" cracks, which have been found to be one of the causes of rail failures due to base fractures. The process is so far applicable only to standard section rails (low T-rails) and it has not been found feasible up to the present time to introduce the method in the manufacture of girder rails.

One rail mill has recently introduced the use of the vertical or idler-roll for plain girder (high-T) rails. This is to eliminate roughness frequently observed on the top of the heads of standard section (low-T) rails. The tops of rails so rolled have a uniform, clean surface, and the thought is expressed that this should have some tendency toward preventing corrugation.

Most of these advances in the art tend to indicate the desirability of increasing the hardness of rail steel for electric railway work to as high a degree as possible, but without too great sacrifice of ductility. The high-carbon steel now used in girder rails has not proved detrimental where the rails are installed in pavements. Very few breakages occur and these are not dangerous, because the pavements hold the rails in place and tend to prevent any serious results, such as derailments or equipment damage. There remains some question as to what the carbon content should be for rails which are to be used with certain forms of welded rail joints.

The writer desires to acknowledge the assistance rendered by G. C. Farkell and N. E. Salsich in furnishing data and revising and correcting this article. His thanks are also due to the Bethlehem Steel Company for the photographs of mill processes which are used for illustrative purposes. These were taken especially for this use and some of them were obtained with considerable difficulty.

Report on Unemployment Problem Issued

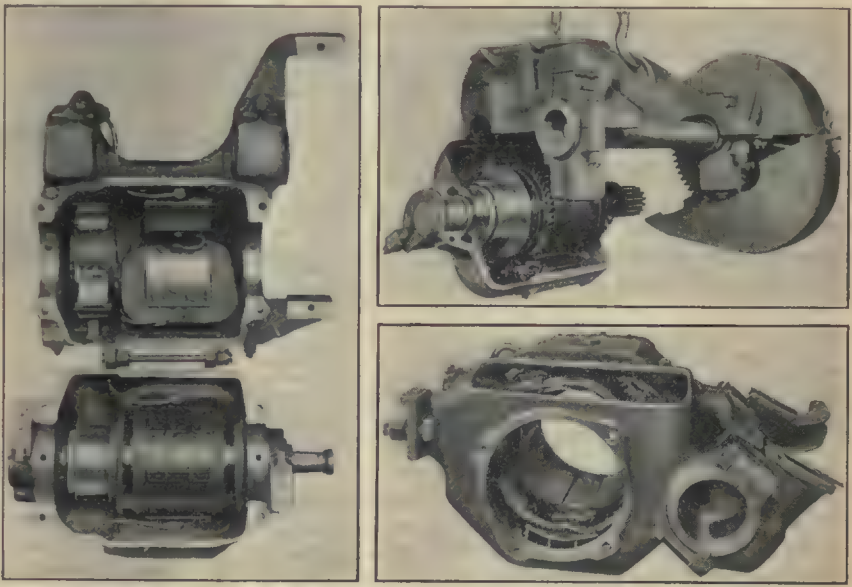
THE National Industrial Conference Board has just issued a report on the unemployment problem, which makes a brief but comprehensive survey of unemployment during normal periods and during a certain business depression, discusses the causes and analyzes the remedies that have been suggested. The report estimates the total number of persons engaged in gainful occupations in the United States in 1920 was about 41,000,000 and that of this number 12,800,000 are wage earners. In normal times, it is believed, an average of about 14 per cent of total working time is lost by each industrial wage earner, due to sickness and other causes, but not including loss from part time employment, for which no reliable figures are to be had. This corresponds to an average number of 1,800,000 people out of work. The report estimates that on June 1, 1921, over one-quarter of the wage earners, or 3,500,000 persons, were out of work.

Why Modern Motors Should Supersede Older Types

Self-Ventilation, Together with the Use of Commutating Poles, Box Type Frames, Bronze Bearings and Improvements in Mechanical and Electrical Design, Has Produced a Motor for Present Day Service

BY J. M. HIPPLE
Manager Railway Motor Engineering Design,
Westinghouse Electric & Manufacturing Company

IT IS quite customary, both in business and personal affairs, to cling to a certain article even after it has been supplanted in public use by something more efficient and modern. Because the old article was once found to meet our particular conditions, we fail to analyze the cost of continuing its use as compared with something more modern and probably better suited to our changed requirements. That is what often happens in the selection of railway motors, and for this reason the writer believes that it will be of interest to study the following facts comparing an older but popular type of motor with more modern types and to show why the modern motor is superior.



AT LEFT, NO. 101-B-2 SPLIT FRAME MOTOR WITH HOUSING OPEN. AT RIGHT, TOP, NO. 38-B RAILWAY MOTOR WITH HOUSING OPEN, SHOWING CROSS LUBRICATION. AT RIGHT, BOTTOM, NO. 532-B MOTOR HOUSING

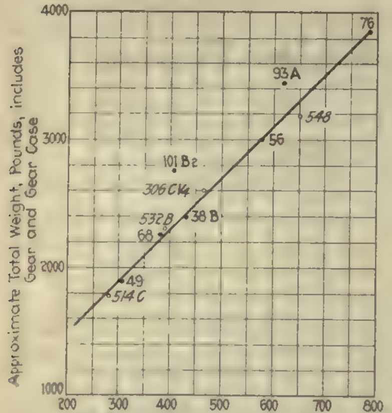
At the time of the introduction of the Westinghouse 101-B-2 motor maintenance costs were increasing rapidly because the construction of existing motors failed to meet the increased service requirements. Compared with previous motors, the 101-B-2 was heavier and more rugged, oil and waste lubrication supplanted grease and the windings were better protected and better insulated. With the exception of vent plates, the motor was fully inclosed with split frame and without commutating poles. The result was that on its service record this motor won many friends, some of whom had been loath to give it up even for more modern equipment.

There has even been some disappointment in the results obtained from the operation of the modern ventilated box frame commutating pole motor as compared with the continued good performance of the 101-B-2, especially on properties where the split frame construction has been well maintained. This has been due, largely, to special conditions among which are: (1) The lighter mechanical construction of the modern ventilated motor, for a given electrical rating, due to causes that are discussed in the following paragraphs: (2) the selection or application of these motors based on their continuous electrical capacity or rating without sufficient consideration having been given to their thermal capacity and mechanical capacity; (3) the workmanship and materials for a period during the war falling far below the pre-war standards, so that some of the modern motors suffered unjustly as a result of this temporary condition.

In a railway motor there are, aside from mechanical construction, two considerations that, from a heating standpoint, govern its ability to perform a given service. One is its inherent thermal capacity and the other its continuous capacity at a reduced voltage. The thermal capacity determines its ability to carry short time peak loads and the continuous capacity indicates its ability to perform a given all-day service. In comparing any two motors as to capacity, it is, therefore, essential to evaluate both these characteristics with reference to the service requirements. The standard types of motors now in general and satisfactory use are of the ventilated type, having an internal blower that draws in air, circulates and discharges it to the outside, as distinguished from the inclosed motors that have no air inlets or outlets. Such motors, of a given physical size, have higher continuous capacity than the inclosed motors of the same size because of the heat that is carried away by the ventilating air.

There are only two ways to dissipate the heat resulting from the motor losses, one is by radiation from the frame and the other by means of air passing through the machine. In the inclosed motor, except for the effect of slight air leakage, all the heat resulting from the losses must be dissipated from the frame by radiation. In the ventilated motor, at the continuous rating, as high as 65 per cent of the losses may be dissipated by the ventilating air, thereby giving a direct gain in capacity or a permissible reduction in size.

The practical result is that in a given service a lighter motor may be used provided the lower thermal capacity of the smaller motor is not a limit. In general, in both city and suburban service these lighter motors do meet the service requirements where formerly the heavier inclosed motor was used, and of course give a very considerable saving both in first cost and in reduced weight of car equipment. For instance, on a car where formerly the 101-B-2 would have been used, it is now



RELATION BETWEEN TORQUE AND TOTAL WEIGHT FOR OLD AND RECENT RAILWAY MOTORS

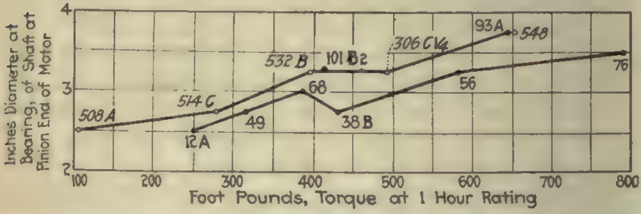
found to be feasible to use the Westinghouse type 532-B or even, possibly, the type 514-C. By total weight of motors and gears, the comparison is shown in the accompanying table. If, however, the user of 101-B-2 motors desires to duplicate that motor in a modern commutating pole motor, as to thermal characteristics, it will be necessary to select a motor of approximately the same weight and cost as the old motor. The total weight of the motor is a rough indication of thermal capacity, but a better convenient check is the size of copper in motors of the same speed. For overloads lasting only a short time, say ten minutes or less, the temperature rise is determined almost wholly by the thermal capacity of the copper windings. For longer overloads the determining factor is the thermal drop through the insulation. By areas of copper size and armature weight the comparison is as follows:

Hour Rating	. Type	Weight, Pounds
40 hp. 500 volts, 520 r.p.m.	101-B-2	2,780
65 hp. 600 volts, 700 r.p.m.	306-CV-4	2,700
50 hp. 600 volts, 665 r.p.m.	532-B	2,325
40 hp. 600 volts, 760 r.p.m.	514-C	1,770

Type Motor	Copper Area, Circular Mils	Armature Weight, Pounds
101-B-2	13,000 approximately	585 approximately
306-CV-4	16,600 approximately	615 approximately
307	13,000 approximately	615 approximately
532-B	10,400 approximately	550 approximately
514-C	7,420 approximately	390 approximately

It is evident from this table that from the standpoint of thermal capacity only it would be necessary to select a motor of about the size of the 306-CV-4 or the 307 to match up with the 101-B-2. Such a heavy motor is undoubtedly better able to stand heavy short overloads without injurious heating than are the lighter motors, but the user pays for this capacity both in first cost and in operating cost.

The use of the wholly inclosed motor, as explained above, resulted in the use of a relatively large motor and one in which the commutating conditions were very favorable during the greater part of the cycle of operation. At the hour rating or at heavier loads the sparking was often very severe, even vicious, but a good commutator surface resulted from the motor being large in proportion to its continuous rating and from the effects of the periods of coasting. The use of the commutating pole, which had been introduced three or four years earlier than the ventilated motor, made it possible to get just as good or even better commutating conditions with these lighter motors than with the heavier non-commutating pole type. If, however, the older types of motors should be ventilated and then be applied up to their limit of heating, it is quite certain that the commutation would be very poor and would in the end set the limit of capacity.



FOOT-POUNDS TORQUE AT ONE-HOUR RATING, SHOWING EFFECT OF VENTILATION ON WEIGHT

BOX FRAME RESULTED IN IMPROVED MAINTENANCE METHODS

The introduction of the box type frame for railway motors came first on the large motors of 100 hp. and upward. The reason for this was that it was found to be practically impossible to get satisfactory operation from split frame motors in these sizes due to slight movement between the frame halves and the bearing housings, which resulted in relatively rapid wear. This movement was due in part to lack of rigidity in the whole structure, but mainly to the difficulty of maintaining the bolts tight enough to insure the proper clamping effect. The improvement resulting from the use of the box frame in the sizes was so great that it was inevitable that the same construction would be tried on the smaller sizes, where the same difficulty of wear between housings and frame halves was causing considerable trouble. Some difference of opinion as to the desirability of the box construction in these sizes naturally developed, since at first consideration it appeared that such motors would be much less accessible for repairs as compared with the split frame motors where the lower half of the frame could be swung down into the car pit so as to permit the removal of armatures and field coils without removing the motor from the trucks.

ARMATURE OF NO. 532-B RAILWAY MOTOR, SHOWING CONSTRUCTION OF FAN

Actual experience, however, has shown that with proper equipment for lifting the car body from the trucks and for handling the motor the use of the box frame motor has, in reality, brought about marked improvements in maintenance methods. Carhouse equipment is now provided whereby the entire motor is easily lifted out and put in the shop, where working conditions are very much better than in a dark pit. The improved operation resulting from the use of the box frame motor has led to its adoption as the practically universal standard.

It is interesting to note the relative weight of motors of designs produced at different periods. The 101-B-2 motor followed the 68, and was followed by the 306 and 307 motors, which were followed in their turn by the ventilated type motors, 532-B, 306-CV-4, 548, etc. From the graphs showing the relation between torque at the one-hour rating and total weight including gears and gear cases it is seen that the old line of motors, 49, 38-B, 56, 68, and 76 fall in a straight line curve. The 93-A and 101-B-2, coming after a period of mechanical troubles with the older motors and at a time when a reduction in troubles was due, swung well away from this straight line. The increased total weight resulted from the heavier shaft, frame and all mechanical parts. The later ventilated motors, although maintaining much the same rugged mechanical construction, swung back again on the straight line, showing the effect of the ventilation in the weight, even at the one-hour rating, as well as of refinements in design. The graphs showing the relation between diameter of pinion and shaft bearing and torque indicate that no sacrifice was made in the shaft and bearing diameter in the present standard motors. These show also that the 101-B-2 was the pioneer in providing "oversize" shafts.

The production of motors that are sufficiently rugged to stand up under the severe modern service conditions and yet that weigh no more per foot-pound torque than the older motors that proved inadequate as service conditions increased is the result of many factors. The effect of ventilation, the commutating pole and the box frame mentioned above has been supplemented by a more exact knowledge of the possibilities of electrical design, improvement in mechanical details, the use of bronze bearings instead of cast or malleable iron and wonderful improvements in gear and pinion materials.

It thus appears that the 101-B-2 motor was in its day a distinct achievement, and a recognition of the greatly increased duty requirements, but the ventilated, commutating-pole type motors that have superseded it represent just as great an achievement because of their equally rugged mechanical construction, their reduced first cost and their reduced operating cost.

Notes on Swiss Heavy Traction Development

British Traveler in Switzerland Studies Present Status of Electrification in Manufacturers' Plants and on Operating Properties and Reports His Observations

AT THE request of the editor of the *Electrician*, London, Dr. S. P. Smith has recently written out for that paper some of the things which he noted in a tour of observation through Switzerland. Among his observations regarding heavy traction were these:

At the Oerlikon Works there was in the shops such a preponderance of locomotive construction under way that all other work seemed negligible in comparison. Many freight locomotives for the St. Gothard Railway were being built. There were in the shops a number of locomotive drivers sent by the Federal Railway Administration for training, to prepare them to operate these locomotives later. It was evident also that the compensated series motor with phase-displaced commutating field, introduced for traction by Dr. Behn-Eschenburg many years ago, is popular for single-phase railways.

In the shops also were giant waterwheel alternators of low frequency (16⅔ cycle) and transformers for the Federal Railways, as well as a three-phase motor coach for the Burgdorf-Thun Railway. A 1,500-volt, 50-cycle rotary converter for traction work was also noted.

At the Baden Works of the Brown-Boveri Company the shops were also filled with work for the Swiss Federal Railways. The observer was interested in the robustness of construction of the locomotives and the plan used for cooling the transformers. The latter are placed in strong tanks through which oil is pumped, while the oil is cooled in pipes placed along the outside of the locomotive cab or in a cooler operated by a fan. He noted also the differences between the Oerlikon and Brown-Boveri single-phase traction motors. In the former there are no resistance connectors between the armature winding and the commutator segments, whereas such connectors are used in the Brown-Boveri motor. The resistance connectors in the latter motor are not placed in the slots as in earlier machines, but between the segments and the coils to insure cooling. The object in reverting to the use of these connectors is to give greater freedom in design. Wave rather than lap windings are used on the armatures.

As to the St. Gothard Railway, Dr. Smith said that electric traction has made a great difference on this line. Instead of three steam locomotives, two electrics haul the express trains more rapidly. However, owing to the light freight and passenger traffic at present full advantage cannot be taken of the electrification. At present the Ritom station is the only source of power for the St. Gothard line, but the load on this is light, probably for the reasons mentioned and further because only the mountain section of the line is as yet electrically operated. The pressure tunnel between Lake Ritom and the water tower forming a part of the hydraulic plant has given considerable trouble from leakage, but by reducing the effective head the management has been able to keep the plant running. The leakage is due to cracks in the rocks produced by blasting during construction. When the second power plant, at Amsted, is completed the Ritom pressure tunnel will be repaired. Steps are being taken to prevent a repetition of the Ritom trouble at Amsted. The latter plant will be operated during 1922.

Dr. Smith found the Loetschberg Railway very busy due to daily shipments of 10,000 tons of coal from Germany to Italy over this route. He found that the 2,500-hp. Oerlikon locomotives, of which thirteen are in use, gave much smoother starting of trains than the motor coaches on the London lines. He noticed no signs of vibration, and stated that in the more recent designs springs have been put inside the pinion instead of the gear wheel to eliminate vibration. Dr. Smith visited also the Bernese Railway, electrified on the same system as the Loetschberg (single phase), where there are now fourteen 1,000-hp. locomotives in use.

At Spiez, where the Loetschberg as well as the Bernese locomotives are overhauled, there were only three out of twenty-eight locomotives in for repairs. One of these was a Loetschberg locomotive which had been stripped for its triennial overhaul. He was impressed by the small amount of repair work that had been necessary, even with the terrific wear and tear on the locomotives since 1913 due to heavy coal traffic.

Industrial Forum Formed

The Polytechnic Institute of Brooklyn, N. Y., has inaugurated an industrial and executive forum for the purpose of creating a better understanding of business and industrial problems. On Tuesday evening, Jan. 24, Professor William Z. Ripley of Harvard University will speak on "The Problem of the Railroads." On Monday, Feb. 6, George W. McAneny, chairman of the Transit Commission, will discuss the transportation problem of New York City. These lectures will be delivered in the Auditorium of the Polytechnic Institute, 99 Livingston Street, Brooklyn, N. Y.

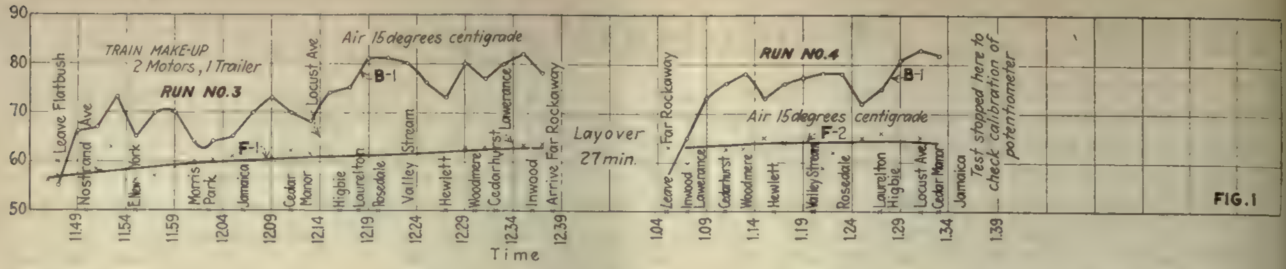


FIG. 1

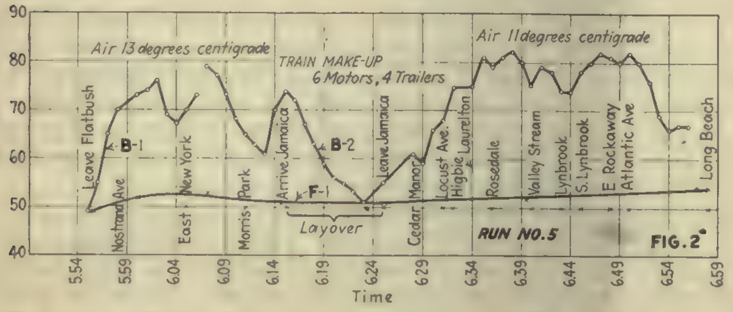


FIG. 2

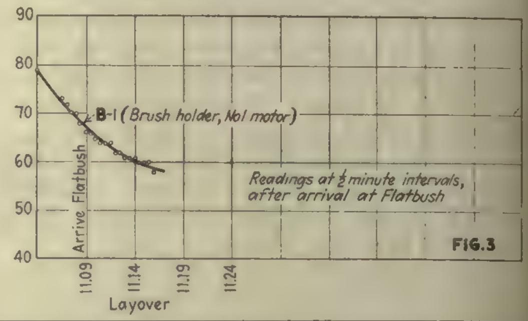


FIG. 3

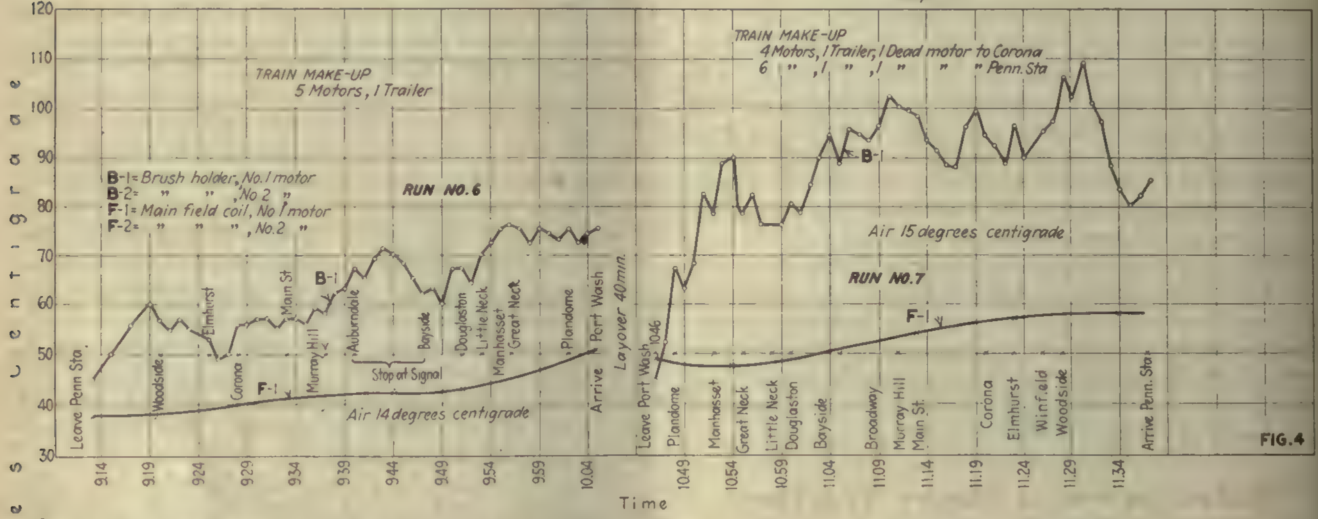


FIG. 4

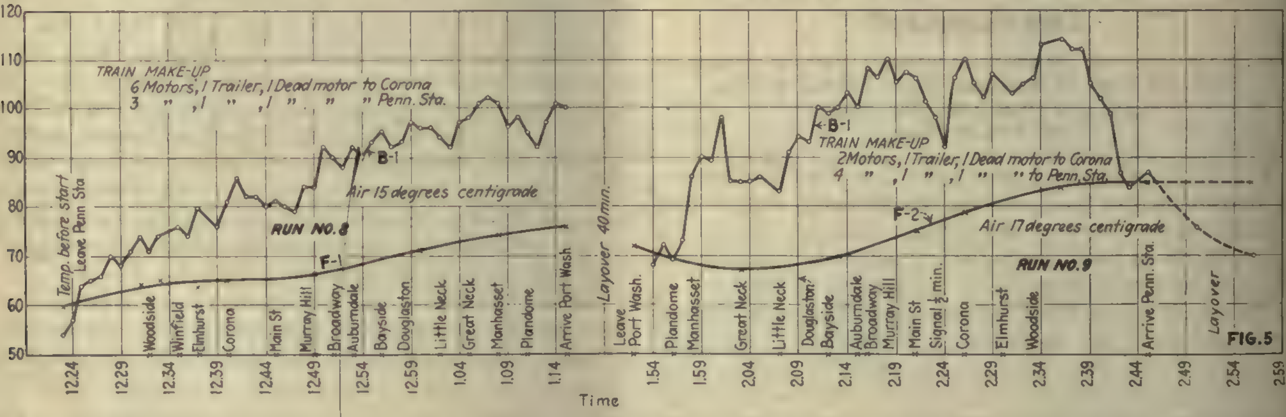


FIG. 5

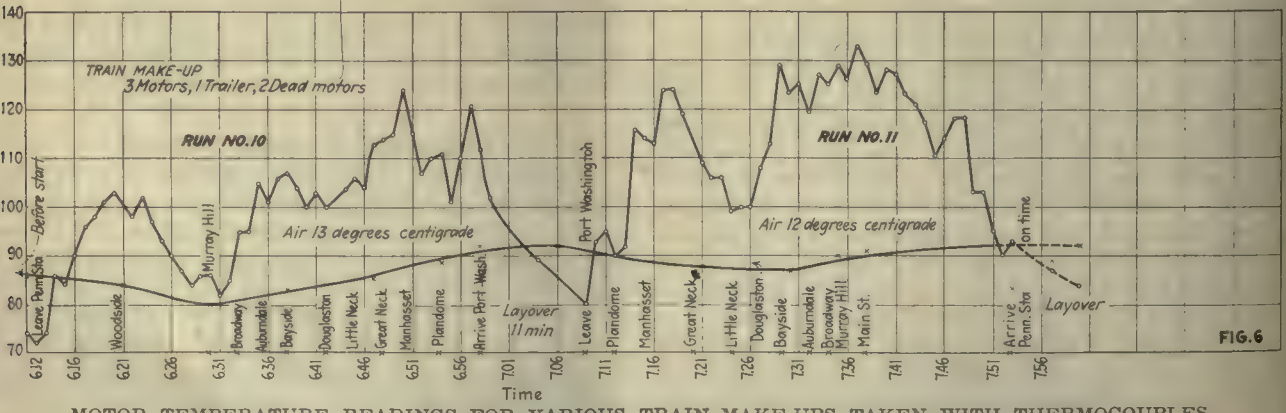


FIG. 6

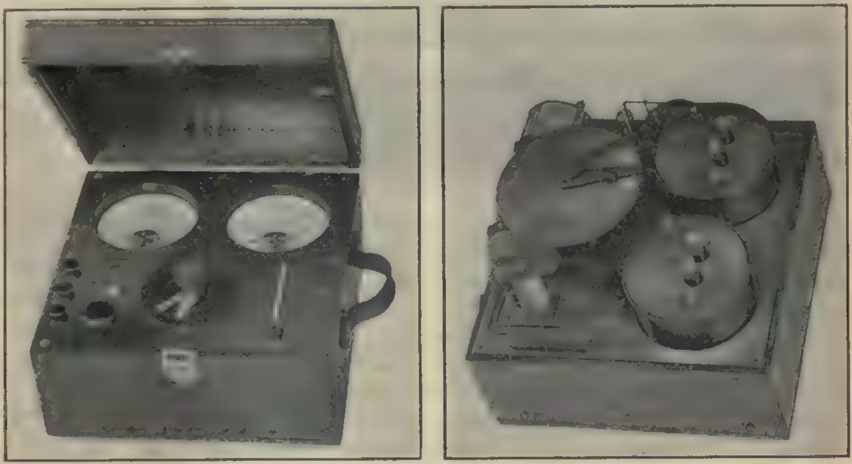
MOTOR TEMPERATURE READINGS FOR VARIOUS TRAIN MAKE-UPS TAKEN WITH THERMOCOUPLES
Runs Nos. 3 and 4 between Flatbush Terminal and Far Rockaway; run No. 5 between Flatbush Terminal and Long Beach; runs Nos. 6, 7, 8, 9, 10 and 11 between Pennsylvania Station and Port Washington

Determination of Train Make-Up

A Description of the Tests Made and the Results Which Were Obtained to Determine the Maximum Number of Trailers that Can Be Included with Safety in Long Island Railroad Electric Trains

BY G. C. BISHOP
Superintendent of Motive Power Long Island Railroad, New York, N. Y.

IN CONSIDERING the problem of the maximum number of trailers that can be included in any train with safety, it is evident that the ratio of trailers to motor cars will vary with service requirements. This would require an analysis of each division to determine the variation in schedule speed, number of stops per mile, average length and frequency of stops, length and severity of grades, layover at terminals, etc. In actual operation, however, it is inconvenient if not quite impossible to have several types of train make-up, as trains are made up at terminals continually for several different classes of service, so that the most convenient plan is to decide on a train make-up for the most severe condition, and then to use this as standard.



POTENTIOMETER USED FOR TAKING READINGS DURING TEST

Electric operation was first started by the Long Island Railroad in July, 1905. The first order was for 134 motor passenger cars and five motor baggage cars, each equipped with two Westinghouse type 113 motors. These have been operated exclusively on the Atlantic Avenue and Rockaway Beach Divisions. As the electrification of other divisions progressed and the service was extended under the East River into the Pennsylvania Station in New York City the first cars soon became inadequate to handle the service, and in 1908 more motor cars were ordered. These were entirely different, being longer and heavier and each having two Westinghouse type 308 motors. These equipments were designed for all motor car operation with forced ventilation of the motors. It was soon found, however, that the motors had sufficient capacity to operate the service without forced ventilation and later it was determined that trailers could safely be added.

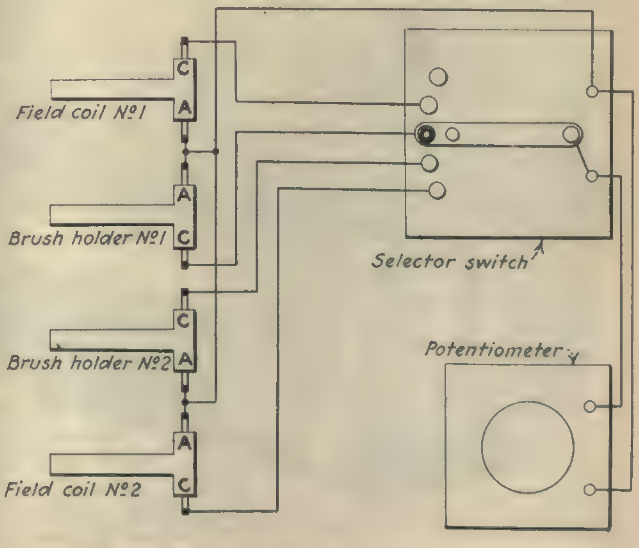
TUNNEL OPERATION NECESSITATED USE OF STEEL TRAILERS

In 1915 twenty steel trailers were ordered for the tunnel operation to Pennsylvania station and Flatbush Avenue. Tests at this time to determine the safe proportion of trailers were made in the conventional way with thermometers and a train make-up to include not more than one trailer for each two motor cars was specified. Exceptions to this ruling permitted the use of a higher proportion of trail cars in special trains, making long runs with few stops, notably Belmont race-track trains.

An order for twenty-five additional steel trailers was placed in 1917 and forty-five more were ordered and placed in service in 1918. Fifty additional trail cars were purchased in 1919 and placed on the road during the summer of 1920.

It will at once be appreciated that trailers could not be added to trains indefinitely and that some decision as to a standard train make-up was necessary. Accordingly, a series of tests was made in co-operation with engineers from the Westinghouse Electric Company to determine the heating of the motors with different train make-up and with varying service conditions of different divisions.

Our experience has shown that the capacity of the WH-308 motor in our service is limited by the short-time heavy-duty current taken by the motor, rather than by its continuous capacity. This is due in part to short runs with long layovers, which are the rule. Measurements of temperature by thermometer, made as they are at the end of the day, give no direct indication of the heavy overloads that a motor may have handled at short intervals in accelerating its train on the maximum grades.



WIRING FOR THERMOCOUPLES IN RAILWAY MOTOR TEST

THERMOCOUPLES READY FOR APPLICATION TO MOTORS

To get a measure of this a new method was employed. Thermocouples, which for some years have been used for reading hot spot temperatures in turbo-generators and transformers, were used. Two motors on car 1690 were equipped with thermocouples. One thermocouple was mounted under the tape of a main field coil and another on the brush-holder, as shown in illustrations.

The readings were made directly with a potentiometer, the method being the same as that employed in reading turbo-generator temperatures. A dial switch was provided readily to put each thermocouple in circuit. Some description of this instrument and the method of securing temperatures will be of interest.

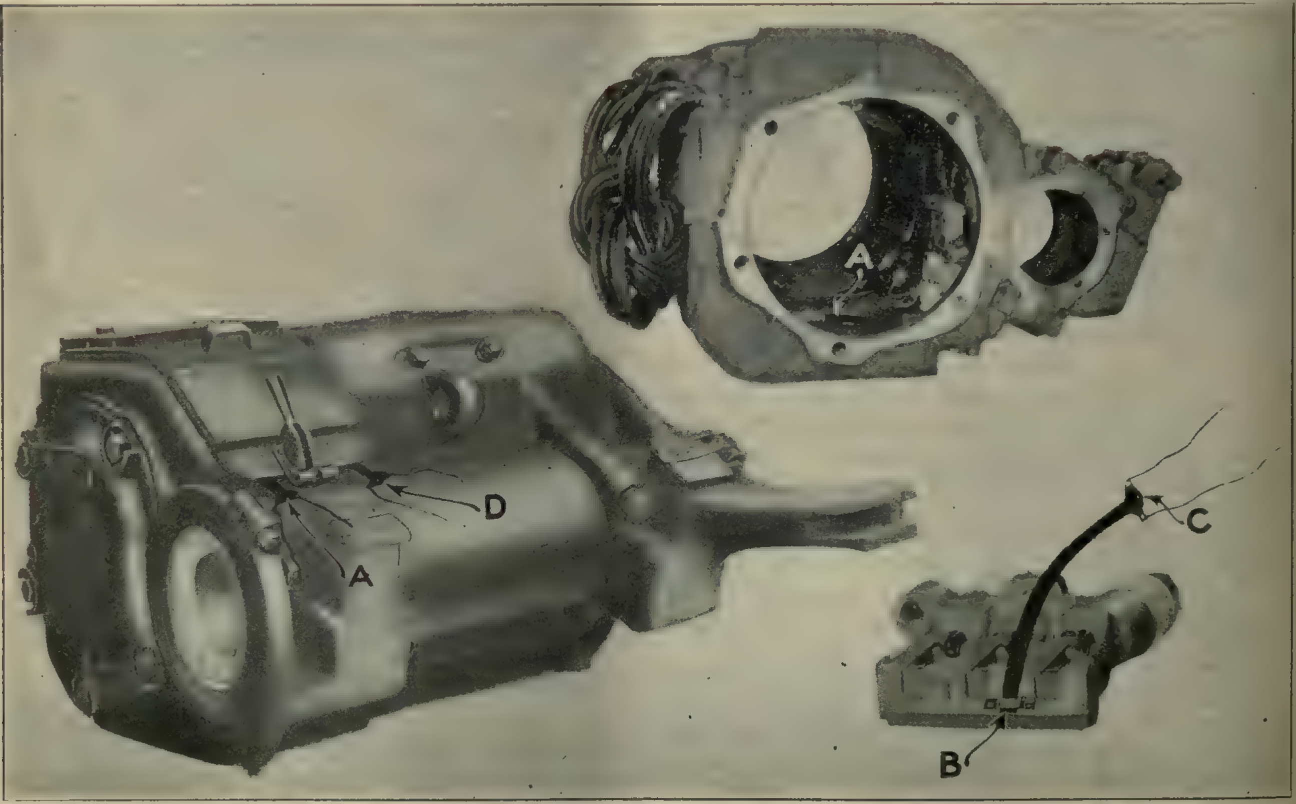
The potentiometer shown in accompanying illustrations operates on the slide wire potentiometer principle. A simplified diagram is also shown. A dry cell supplies current to a resistance wire equipped with two sliding contacts. The drop of potential between these contacts is proportional to the current in the wire and to the distance between them. Two pointers which move with the contacts indicate the positions of the two contacts. The scale is calibrated in degrees. A rheostat in the battery circuit is used for adjusting the current exactly to the value that will cause a drop of emf. per degree on the temperature scale equal to the thermo emf. per degree in the couple. Leads from the thermocouples connect to a sensitive galvanometer and to the slide wire contacts of corresponding polarity. If the emf. between the contacts is equal to the thermo emf. there will be no deflection of the galvanometer. If higher or lower, there will be a deflection of the galvanometer in one or the other direction. By changing the distance between contacts and using the galvanometer as a guide, the position at which the slide emf. balances, the thermo emf. is easily located.

In practice the lower pointer is set at the position on the scale corresponding with the temperature of the cold couple, and the upper pointer is moved until a balance is obtained as described. Actual temperature of hot couples can then be read directly on the scale.

One thermocouple is embedded in the mass of which the temperature is to be measured and the other, the "cold" couple, is contained in the instrument case and is in contact with the bulb of a mercury thermometer, by which the temperature of the cold couple is observed.

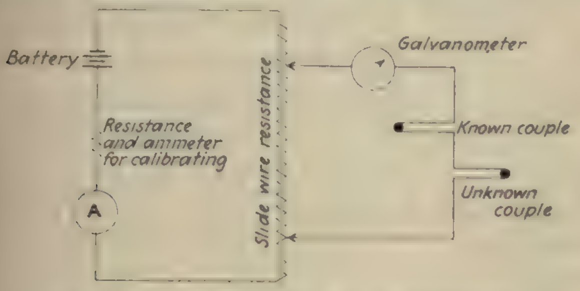
CONSTRUCTION OF THE THERMOCOUPLES

Westinghouse thermocouples are made by welding copper and "advance" (nickel-copper) alloy ribbons together. These ribbons are ordinarily 0.005 in. thick, 0.25 in. wide and of any desired length. The couple is insulated with mica and micarta paper to withstand a temperature of at least 150 deg. C. After installation in the motor a voltage test of 1,000 volts to ground was applied. A diagram of the actual connections used in the test shows just how the connections were made.



LOCATION OF THERMOCOUPLES ON FIELD COIL AND BRUSH-HOLDER AND METHOD OF BRINGING LEADS FROM MOTOR SHELL

Runs were made on the Atlantic Avenue, Rockaway and Long Beach Division of the Long Island Railroad with what might be termed normal trains, *i.e.*, well within the capacity of the motors as determined by previous tests with thermometers. The potentiometer, as noted, is calibrated directly in degrees Centigrade, and after some experimenting it was found that accurate readings of the temperature of the brush-holder on one motor could be taken each minute, while the field temperature, which varied very slowly, could be taken during station stops. At intervals of eight or ten minutes readings were made on the thermocouples in the other motor as a check.



Diagrams of Connections for Potentiometer

Brush-Holder Temperature Varies Rapidly

It is appreciated that certain inaccuracies occur in this method of obtaining temperatures. The instrument is somewhat affected by the jar of the train and, as indicated by the curves shown, the temperature of the thermocouple mounted on the brush-holder varies very rapidly, particularly during acceleration. The direction in which the car is moving also makes a difference of a few degrees due to the difference in ventilation. Motors were run with bottom covers off on the commutator end and ventilated commutator covers, the standard summer time custom on this road. Repetition of similar runs, however, shows remarkable consistency. The temperature at the brush-holder is affected somewhat by commutator friction, sparking at the brushes and by the resistance between brushes and box. It is fair to assume, however, that the temperature at this point follows the same trend as the rest of the armature circuit.

Under the service conditions on this road the limiting condition in the WH-308 motor is the temperature of the soldered connections, and signs of distress appear when there is no indication of roasting of the coils themselves. Temperatures at these hot points are indicated proportionately, at least, by the thermocouple located on the brush-holder.

Referring to the graphs two facts are apparent. With the so-called normal train there is no tendency for the temperature to increase above a very conservative figure. With an increasing number of trailers in the train, however, as indicated by the graphs showing temperatures obtained on the Pennsylvania Station-Port Washington runs, the field temperature which represents closely the total or average temperature of the motor continually rises and, what is more significant, the spread between the field temperature and the armature circuit temperature increases, indicating that as the proportion of trail cars is increased the conditions affecting armature connections are increasingly severe. This is not indicated directly by the usual method of ascertaining motor temperature.

These tests have been most enlightening. We have been able to analyze our service conditions and to determine the maximum proportion of trailers that can be operated in our trains without exceeding safe motor temperatures, with the usual penalty of increased maintenance. We are arranging our operation for the future on this basis.

Friction Device and Catch for Windows

CAR WINDOWS must be kept tight so that they will not rattle and still they must work with sufficient freedom so that lady passengers can raise and lower them easily. The accompanying illustration shows a friction device and two automatic stops which have been applied to the cars of the International Railway at Buffalo, operated by the Mitten Management, Incorporated. With these applied to the window posts the windows are kept tight at all times and they are easily raised. In addition to these two desirable features it is impossible for the windows to drop on the passenger's arms or fingers. Both the friction device and the stops are set in the posts instead of being applied to the sash. The friction device has a small shoe which slides in the slot, and when the window is raised a light tension spring is compressed which creates very little friction and practically all the passenger has to do is to slide up the weight of the sash.

When the window is lowered the shoe slides down to the other end of the slot and a stiff spring is compressed which has just enough tension to allow the window to drop gradually. The stops are so placed that the bottom edge of the window sash rests on one when it is wide open, and another is placed 8 in. from the window ledge, which prevents a window while being lowered from dropping on a passenger's arms or fingers.

Window Catch and Stop

This sort of safety device appeals to the riding public, as every time a window is lowered there is a demonstration of the thought that has been given to this safety feature. In addition to being a desirable safety device, there is at the same time much less wear and tear on the window sash and fewer window glasses are broken, which means reduced maintenance costs.

Letters to the Editors

Varieties in Safety Car Design Unfortunate

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., Jan. 14, 1922.

To the Editors:

In reviewing the article by L. H. Palmer, president of the American Electric Railway Transportation & Traffic Association, as published in the JOURNAL of Jan. 7, 1922, I note reference to standardization as applied to the construction and equipment of safety cars, and while unwilling to enter into a controversy, I think it would be well for you once more to point out the fact that the electric railway industry for many years has suffered and is still suffering from a constant desire to have something special, on the part of its mechanical and transportation superintendents, as well as the managements of some properties.

There has never been as concrete an example of what might be done in the way of standardization of rolling stock as in the case of standard "one-man" Birney safety cars and where car builders are offering them to prospective customers at considerably less cost than the special car covered in some instances by specifications.

The Birney car is without question applicable to any service in any city or in any community, and at a time when additions to capital account or expenditures from earnings for either new rolling stock or conversion of old is a matter to be carefully considered it would seem as though too much stress is laid upon requirements of certain localities as seen by operating officials therein.

Furthermore, it needs no particular demonstration to understand that Ford cars are produced at a low cost not alone because of design and material, but largely because of the ability of the manufacturer to turn such vehicles out in large numbers and to make purchases in quantities that enable them to buy most economically.

It is unfortunate that the exploiting of special requirements, especially as seems to affect Baltimore and Chicago, should be inflicted upon this particular and very important development. It is not a question of stagnation following standardization, as in a broad sense this need never follow, and the issue should not be befogged in any such manner.

W. G. GOVE,
Superintendent of Equipment for
Lindley M. Garrison, Receiver.

Do Armatures Rub Top Pole Faces?

Jan. 14, 1922.

To the Editors:

I should like to have you publish some information that will assist in settling the following controversy:

Smith claims that in a railway motor operating under a car, when the current is applied and the car is going in one direction, the armature rises from the bottom pole pieces, and comes as near the top pole pieces as it is allowed to do by the armature caps. He claims to have seen quite a number of armatures damaged on account of loose axle caps, and that this partly proves his contention. He also said that sometimes in order to determine the wear on armature bearings, in an emergency and not as a regular thing, of course, he would have some one set the brakes to prevent the car from moving and would then apply the current while he watched the armature by opening up the hand hole in the top of the gear case. With the controller set for motion of the car in one direction he would see the pinion climb up the gear as far as the wear on the bearing would permit.

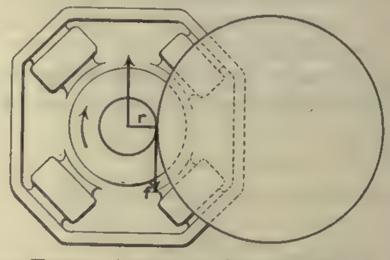


DIAGRAM OF FORCES ACTING AT PINION END OF ARMATURE

Brown claims that this cannot be; that with an even magnetic field the weight of the armature causes a pressure always to be exerted against the bottom bearing.

This discussion relates, of course, to motors with worn-bearing conditions.

A READER.

EDITOR'S NOTE.—Smith is right in his assumption that with the controller set for motion of the car in one direction the armature will rise so as to come nearer the top pole faces to the extent that the wear in the bearings and housings will permit. Armatures are damaged quite frequently due to their rubbing the top pole faces, and many roads use metal gages to determine the wear that would permit movement toward the top of the motor. This tendency of the armature to rise is not primarily* caused by the magnetic pull, but rather the tendency of the pinion to ride up on the gear when the armature is turning in one direction.

The reason for the pinion climbing can be best illustrated by reference to the accompanying diagram. For the sake of illustration, assume a 50-hp. motor rotating in the direction indicated by the arrow at a speed of 500 revolutions per minute. The force, *f*, due to the torque of the motor at the pitch line of the pinion and gear is assumed as being in a downward direction. This is balanced by an equal force in an upward direction at the center of the armature. If this force is greater than the weight of the armature, the pinion will ride up on the gear. The force in this case will be equal to 50 (assuming the motor to be developing its rated horsepower) times 33,000 ft.-lb. per minute divided by 500 r.p.m., times the radius from the center of the armature shaft to the pitch line of the pinion, which may be considered as 4 in. or ⅓ ft. times 2π. With the conditions as assumed, this force will be approximately 1,576 lb. Thus

$$f = \frac{50 \times 33{,}000}{500 \times \frac{1}{3} \times 2 \times 3.1416} = 1{,}576 \text{ lb.}$$

The opposing force is the weight of the armature, which for a 50-hp. motor would be approximately 600 lb. One-half of this weight would be supported at each bearing, so there would be 300 lb. at the pinion end bearing exerting pressure in a downward direction. We thus would have an excess of 1,276 lb. tending to raise the armature at the pinion end so as to cause it to ride up on the gear. Of course, there is no force at the other end of the armature tending to raise it.

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*There is of course an additional secondary lifting effect due to the unbalancing of the magnetic field through eccentricity of the armature in the bore. This, however, only comes into action after the armature has been lifted by the pinion torque.

Equipment and Its Maintenance

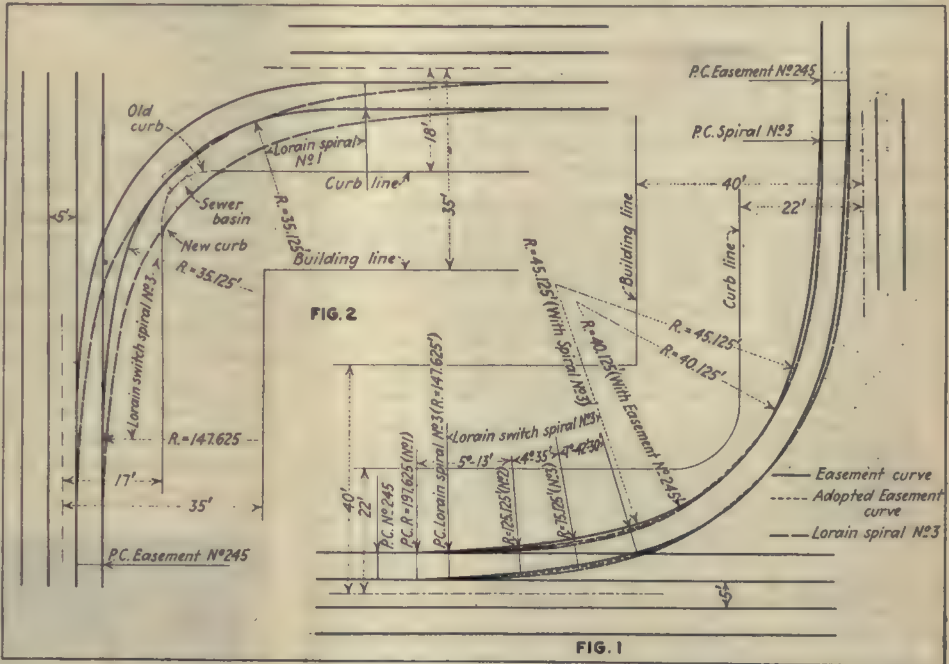
Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

A. E. R. A. Easements Versus Brooklyn Practice

An Explanation and Example of the Difficulty of Standardizing This Detail of Track Layout—The Author Gives One of His Own Designs of Spiral with Reasons for Its Form

BY S. STRIEZHEFF
Brooklyn, N. Y.

APPENDIX "C" of the report of the committee on way matters, as submitted to the 1921 convention of the American Electric Railway Engineering Asociation, invites discussion of the merits of spiral easement curves suggested for general adoption by electric railways. It further suggests that members study them with reference to their own particular conditions. I have discussed this subject informally with R. C. Cram, chairman of the committee. As I do not agree entirely with his views, I am, at his suggestion, presenting my views here for consideration by those who may be interested in the subject of possible standardization of switch easements and spiral curves.



SPECIAL TRACKWORK LAYOUTS FOR BROOKLYN

Fig. 1—Easement curve connecting tracks on intersecting 44-ft. streets. Fig. 2—A typical Brooklyn easement curve situation, involving the cutting away of a curb corner.

For a number of years I have had to juggle all kinds of special trackwork layouts. With my nose close to the grindstone, but with an unobscured vision, I possibly realize the essential factors in matters of this particular kind more correctly than those who are not so directly connected with the work. Mindful of the injunction in the committee report, "with reference to their own particular conditions," I believe that it was wrong procedure on the part of the committee to prescribe standard easements without considering more fully the actual conditions and physical limitations that the electric railways have to contend with.

As to Brooklyn, I venture to assert that had the committee fully informed itself as to the relative percentages, in that city, of roadway widths at special trackwork connections, it would have dropped any suggestion of 200-deg. radius switch easements for adoption in this otherwise spacious borough.

First, the intervening, long-radius curve immediately following the switch radius, adopted for greater car clearance at the beginning of the spiral, is altogether unnecessary, considering the maximum size of B. R. T. surface cars. It only unduly lengthens the lead and increases the cosecant, thus bringing the curve nearer to the curb, where ordinarily there is lack of room under the best of conditions.

The committee report divides the suggested easements into two groups; four easements indicated in heavy type for general use and three easements in light type to be used only in special cases on account of local conditions. In a recent communication to E. M. T. Ryder of the Third Avenue Railway, C. A. Alden of the Bethlehem Steel Company admits that "for Brooklyn conditions it would be most unusual for the 'heavy-face tables' to be available," further stating that "it was pointed out to the sub-committee last year that the majority of cases would be the 'special condition' shown in the 'light-face tables.'" A somewhat paradoxical proposition, is it not?

For a location shown in Fig. 1, a location exceptionally favorable for Brooklyn streets, with two 44-ft. intersecting roadways, the use of special easement No. 245 was suggested as indicated by full lines, in place of the originally intended Lorain spiral No. 3, represented by dash lines. This was to allow for a 200-ft. radius switch instead of one of 150-ft. radius. In the meantime, however, with the same purpose in view I worked out an easement curve indicated by dotted lines, retaining spiral No. 8 at the plain end of curve in intersecting street. This easement consists of three radii leading up to the point of the frog and then abutting on the plain curve of 45.125-ft. radius with a cosecant practically the same as in easement No. 245 with a 40.125-ft. radius. This curve has been approved for installation at this particular location. This easement is certainly sturdier and is not afraid of the chill of practicability, as compared with easement No. 245, which smacks a little of the hothouse.

It may even be advisable to use the approved easement in other locations if a 200-ft. radius switch is desired, and where conditions permit it. This retains a constant lead and frog (except one arm), which is on the same principle as Lorain spiral No. 3, presenting the same conditions up to a plain curve radius of 52.625 ft.

An interesting illustration of what we have to contend with in Brooklyn is given in Fig. 2. This location presents conditions much more favorable than the average conditions that obtain here, considering the roadway widths, and yet the curb corner has to be cut away, as indicated, to allow cars to round a curve which provides clearance only in the tangent track on the No. 3 spiral end. It was necessary to come down to a central radius of 35.125 ft. with a Lorain spiral No. 1 on the plain end. What happens with an easement No. 245 in place is indicated by dash lines.

SUMMARY OF CONDITIONS

Summing up the foregoing I would say that only in exceptionally favorable locations like the one shown in Fig. 1 at street intersections of less than 45 deg. angle would it be possible to use 200-ft. radius switches, and even there probably not with A.E.R.A. easements. This is true on account of the intervening long-radius curve following switch radius, as no extra clearance is necessary for Brooklyn cars. And although these easements are generally somewhat unwieldy and take up too much of the arc to allow for any variation to suit a particular local condition, such as manhole obstructions and others, I would prefer them to the ones at present in use, were I not a slave to the habit of facing facts and conditions.

In conclusion I would say that all herein is stated entirely in a spirit of co-operation, remembering Shakespeare's words: "No might, nor greatness in mortality can censure escape!"

Weighting Lanterns to Keep Them Upright

ONE of the difficulties experienced by electric railways is that of keeping lanterns from tipping and blowing over where it is necessary to place them at night during construction work on streets or highways. Even though the workman places the lanterns in their proper position so they will warn traffic of danger, still a strong wind may arise that will tip one or more of them over and extinguish the light, thus causing a dangerous condition.

The *American City* for January refers to the use of a small concrete block in which the bottom of the oil reservoir of the lantern has been imbedded to prevent such occurrences. To make the block a form of lumber 8 in. square and about 4 in. deep is made. A portion of the concrete is placed in the bottom, and upon this, in the center, the lantern is placed, care being taken to see that the oil filler cap is above the top of the form. The remainder of the form is then filled with concrete, so as completely to cover the oil reservoir as high as desired. Care should be taken to insure that the oil cap and thumb screw for adjusting the wick are accessible.

Chattanooga Remodels Cars

A Large Amount of Work Has Been Done in Remodeling and Rebuilding Various Cars of the Chattanooga Railway & Light Company Since the Receivers Took Charge of the Property in 1919

AN EXTENSIVE program of rebuilding, painting and overhauling of car bodies has been carried on by the Chattanooga Railway & Light Company during the last two and a half years. The receivers took charge of the railway property on April 18, 1919, and from then to August, 1921, sixty-five cars passed through the carpenter and paint shops, the greater portion of this number being entirely rebuilt or remodeled.

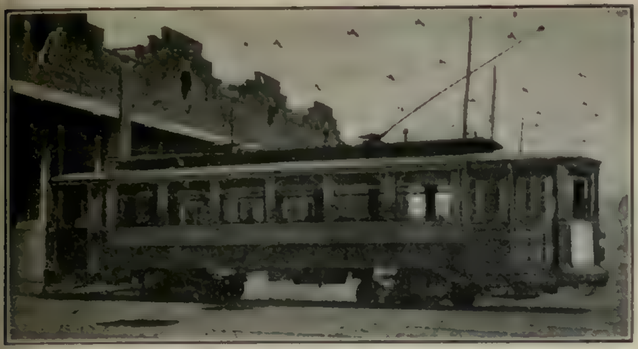
In carrying out the work the cars are first brought into the carpenter shop, where they are gone over carefully and the extent of the rebuilding necessary is determined. Some cars are but partially rebuilt with new posts, new paneling and repaired vestibules, while others are in such bad condition that it has been found necessary to strip them and rebuild the bodies from the sills up. In this rebuilding some cars have been remodeled during the course of construction; eighteen of those now in service have had the old sliding doors replaced with swinging exit doors, as experience has shown that the folding doors work more easily and require less energy on the part of the motorman to open and close. Three cars with small vestibules have had a change made in the location of the conductor's position on the platform. This has been found necessary because with the small vestibules congestion was very great and the relocation of the conductor's position helps to relieve this.

Overhauling trucks	$275.00
Overhauling motors, including new gears and pinions but no rewinding	325.00
Carpenter work on body, including twenty new seats	2,438.38
Body painted with the latest system described	312.18
Other electrical equipment	75.00
Air-brake equipment	40.00
Installing new sanders	45.00
Overhead expense	225.00
Total per car	$3,735.56

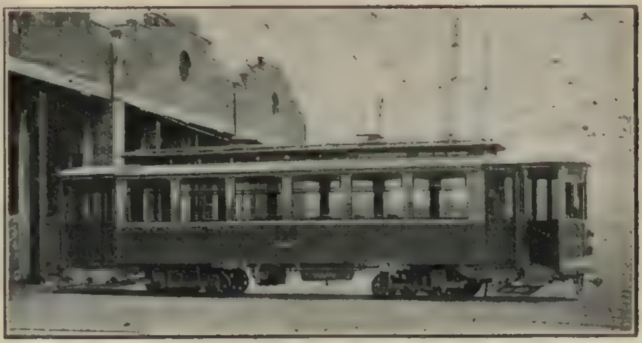
The sixty-five cars referred to included six trailers, and the total cost of body repairs and painting amounted to $53,591.24, an average per car of $577.42 for the carpenter work and $247.06 for painting. Of course some cars cost more to rebuild than others, but the following figures for two general classes of remodeling will give an idea as to the extent of the work. On cars of the 326 class the costs shown in table above apply.

CAR NO. 322 IN COURSE OF RECONSTRUCTION IN THE CHATTANOOGA COMPANY'S SHOPS

In remodeling this class of cars the concave-convex paneling was replaced with straight side tongued and



CAR OF THE 326 CLASS BEFORE REMODELING. NOTE CONCAVE-CONVEX PANELING



THE REMODELED CARS PRESENT A CLEAN, NEAT APPEARANCE

grooved wood. There was an extra side sub-sill to build out the bottom of the post. The sliding doors were replaced with folding doors and the sash was rebuilt from the form shown in the illustration for the original car to the form shown in that for the rebuilt car.

The reconstruction work on cars of the 302 class included costs as follows:

Body work including the rebuilding of old seats	$1,123.95
Painting	349.43
Overhauling motors	400.00
Overhauling trucks	300.00
Overhauling air brake equipment	40.00
Other electrical equipment	100.00
Installing sanders ($20 for labor and $25 for material)	45.00
Overhead expense	179.25
Total per car	$2,537.63

With this 302 class of cars every other post was put in new and every other post was spliced and rebuilt. Some of the cars required new sills while others were found in such good condition that new sills were not needed. The same platform and vestibule framing was used, but the conductor's location was moved and the bulkhead was eliminated. As will be noted by referring to the accompanying illustration, the former concave-convex paneling on the side, which was of wood, was replaced with steel which was flat. In order to install this steel paneling the posts were blocked out until they presented straight sides for the mounting of the steel plates and a piece of wrought iron ⅜ in. x 1½ in. was run lengthwise at the bottom of the post to which the steel was fastened. The same roofing was used.

The above figures apply where extensive reconstruction was undertaken, but where only moderate repairs were necessary the total cost for carpenter work and painting rarely exceeded $500.

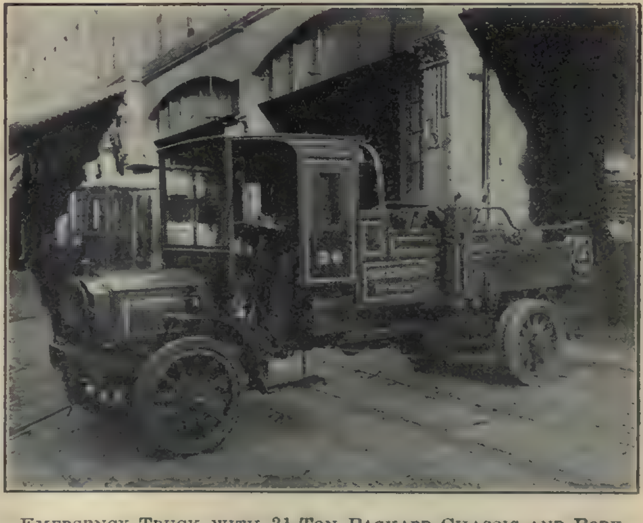
NEW PAINTING SYSTEM USED

After completing the work in the carpenter shop, the cars were run into the paint shop, where they were painted both inside and outside. In the car interior the old varnish was scraped off down to the wood and built up as new. On the exterior most of the cars required the removal of the old paint and varnish and then the painting consisted of a flat color and varnish system which has replaced a method used in former years when a system of enamel or color varnish was used. With the latest system the paint is first burned off down to the wood and then sanded off. A coat of lead primer is applied and then puttying is done, after which three coats of "Krakno" surfacer are added and the sanding process is repeated. Two coats of flat color and one of cadmium glaze are then added. Red striping, trimming and the necessary lettering are then done and two coats of outside wearing varnish are applied, making in all seven coats of paint and two of varnish. The time taken to paint a car with this process is nearly three weeks.

Beaverboard headlining is being tried on some of the cars and the first of this type has now been in service nearly a year. In using beaverboard the upper side is treated with two coats of heavy lead paint as are also the edges of the board. In treating the edges the paint is pounced in well for preservative effects. The under side of the beaverboard is finished with a lead filler and headlining paint, which consists of a cream paint on a lead base. At the time of this installation the beaverboard cost 5⅛ cents per square foot and it appears that 1⅞ cents would take care of the labor and paint, making the total cost about 7 cents per square foot installed.

Motorized Emergency Truck

THE Second Avenue Railroad, New York, N. Y., has recently added several motorized wagons to its equipment for use in connection with track and line repairs. The wagon shown in the accompanying illustration is used for emergency service for rerailing cars and making repairs which require immediate completion in order to restore service to normal operation. This wagon has a 2½-ton Packard chassis, and the body is equipped with bins on either side for carrying the smaller tools necessary, the center portion being used for larger equipment and cables. A substantial step is provided at the rear and a pipe railing along the side. A large bell is mounted immediately behind the cab by a strap-iron framework. This is manually controlled by



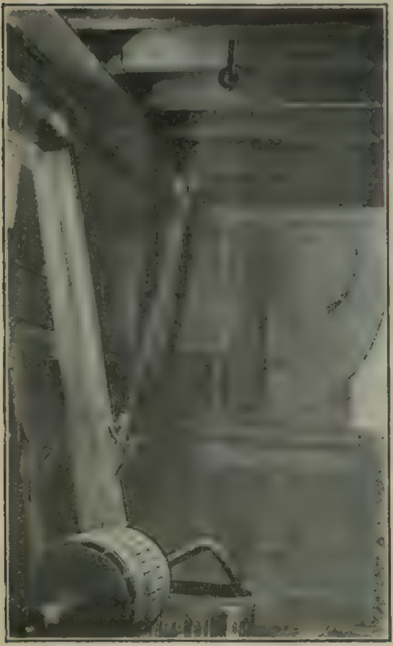
EMERGENCY TRUCK WITH 2½-TON PACKARD CHASSIS AND BODY CONSTRUCTED IN RAILWAY COMPANY'S SHOPS the operator so as to warn pedestrians and traffic in such a manner that a clear right of way will be secured. Jacks are carried on either side of the body mounted on shelves. The body for this wagon was built in the shops of the Second Avenue Railroad to satisfy conditions which had been found to exist.

Wood Preservation Increases Life of Ties

STATISTICS given out by the service bureau of the American Wood Preservers' Association show that in 1920 the railway and commercial treating plants in the United States treated by the standard empty-cell and full-cell pressure processes 44,987,532 crossties, or 20 per cent more than were treated in 1919. About 65 per cent were treated with approximately $\frac{1}{2}$ lb. of zinc chloride per cubic foot, 30 per cent with an average of between 7 and 8 lb. of creosote and 5 per cent by the zinc-creosote process, with $\frac{1}{2}$ lb. of zinc chloride and 4.6 lb. of oil. Of the total number of ties treated, 2,310,793, or about 5 per cent, were reported for use by electric railways.

Service test records show that at least fifteen years service can be expected from well-treated ties under heavy traffic, and only a very small percentage of well-treated ties have been removed after fifteen to twenty years in the track. Ties have given excellent service when treated according to the "Specifications for Preservative Treatment of Wood" included in the report presented at the convention of the American Electric Railway Engineering Association last October.

Special Equipment Not Necessary for Dipping Fields



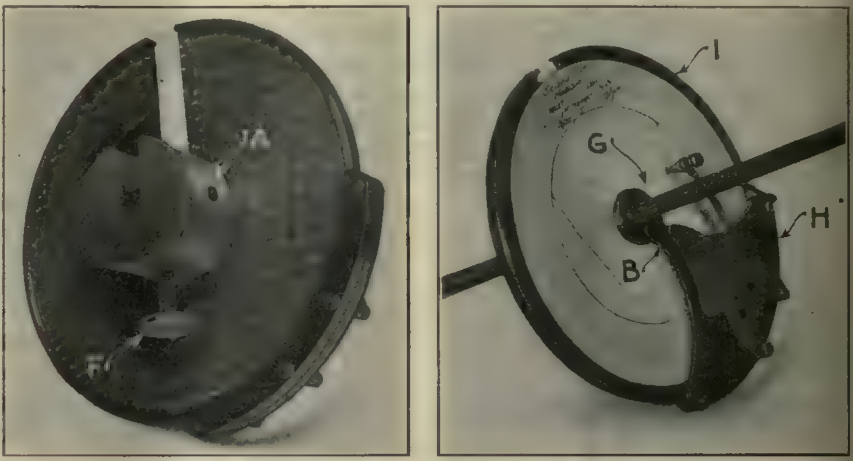
ON A New England electric railway where money was scarce for the purchase of shop equipment, the simple arrangement shown herewith was installed to facilitate dipping railway motor field coils. The dipping compound is carried in an 18-in. diameter by 24-in. high galvanized iron barrel and the coil is lowered and raised by the simple expedient of passing a $\frac{3}{8}$-in. manila rope around a discarded 4-in. trolley wheel fastened to the rafters by two strap-iron hangers. Dipping and draining are thus cared for with resulting saving in dipping compound and convenience of handling.

Graphic Records of Trolley Wire Wear

An Instrument Used by the Puget Sound Power & Light Company Reproduces the Exact Contour of a Trolley Wire on an Enlarged Scale

BY FREDERICK G. WISWELL
Chief Draftsman Puget Sound Power & Light Company, Seattle, Wash.

AN INSTRUCTIVE article on "Gaging Trolley Wire for Renewal," by G. H. McKelway, appeared in the ELECTRIC RAILWAY JOURNAL of Nov. 19, 1921. The latter part of the article points very clearly to the advantage of recording graphically the amount and character of wear on trolley wires.

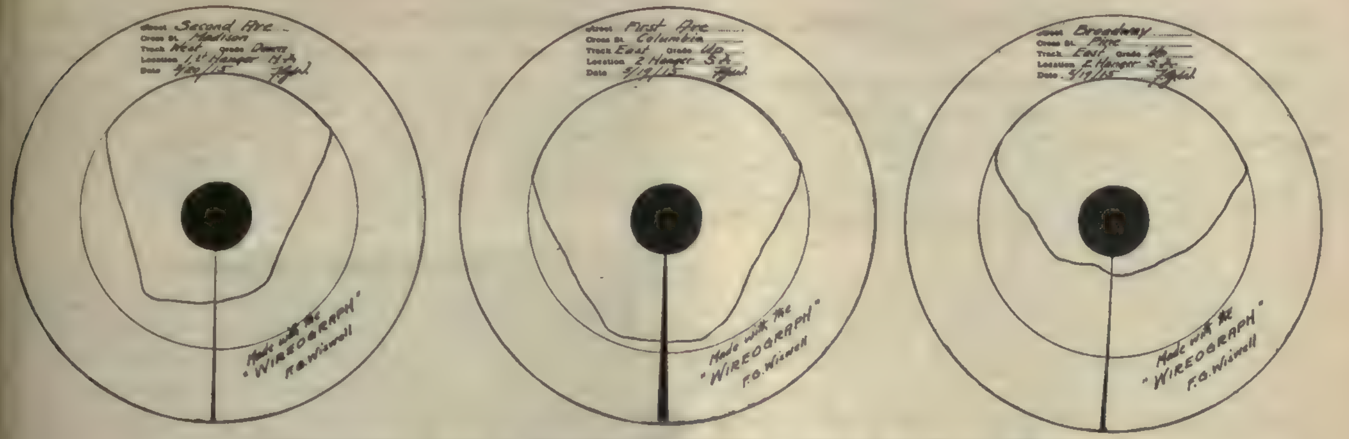


FRONT AND REAR VIEWS OF WIREOGRAPH INSTRUMENT

Prior to selling the traction system to the city of Seattle, the Puget Sound Traction, Light & Power Company (now the Puget Sound Power & Light Company) looked into the question of providing a means for obtaining information in connection with inspecting and replacing worn trolley wire, aside from the old method of using micrometer calipers or of judging conditions by the number of breaks and general appearance of the wire. At that time the writer submitted an original device, since called the "Trolley Wireograph Instrument," for use in such work. The following description and accompanying photographs explain its usefulness to railway companies desirous of keeping systematic records.

The device reproduces graphically the amount and character of wear on a trolley wire by making an enlarged duplicate, on paper, of a cross-section of the wire taken at any point where a record is desired. This record is true to actual conditions, so that comparisons can be made with the original contour. These paper records or charts can be filed for subsequent reference to show where the wire is injuriously worn, and by adding the dates of installing the wire and of making the graphic record a desirable indication of the rapidity of such wear is afforded. The probable length of service of the wire, or of a new wire installed under similar conditions of service, can also be accurately judged.

In addition to the use of the charts in connection with direct maintenance, they have been a great aid to the testing department in determining the tensile strength, conductivity and durability of worn sections. The records not only show where the wire is thin, but careful analysis also often points to the cause of undue



RECORD CHARTS GIVING AN ENLARGED REPRODUCTION OF SOME WORN TROLLEY WIRES

wear, such as improper alignment of wire, defective tracks, etc. With the "Trolley Wireograph Instrument" one trolley repair man assisted by a tower truck and driver can easily make the records without slowing up the traffic, even when the cars are running on a one-and-one-half-minute schedule.

The instrument is adapted to either round, grooved or figure eight wire from single No. 0 to No. 0000 in size, the only change necessary being the removal of the bushing and replacing it with one of proper size, which can be quickly done by loosening a small set-screw, shown at "A" in the photograph. No disturbance of the wire is necessary as the instrument can be quickly attached or detached by a simple clamping arrangement. The tracer arm is shown at "B" and has a hardened steel point at the tracing end. This point is ground to a chisel edge parallel to the longitudinal axis of the wire. The pencil arm engages the tracer arm by means of a simple gear arrangement. The whole mechanism is carried by the sector-plate "H," which in turn can be moved around the rim of the slotted disk "I" when this is clamped to the trolley wire by the clamping screw "F" on the rear side of the instrument. Provision has been made to enable adjustment of the position of the pencil point in reference to the tracer arm when necessary so as to take up wear in the instrument, etc.

Circular paper charts of suitable stiffness to bridge across the slit in the disk, when the pencil is marking, are used as shown in the photograph. These charts are cut from a steel die, including the slit which is provided so that an opening can be made sufficient to pass over the trolley wire. To prevent the chart from turning while the record is being made, a small needle point is provided in the face of the disk. This is shown at "G."

Each chart has printed on its face a true circle concentrically located, its diameter being ten times that of the wire, for convenience in comparing contours. Also a blank form is printed on the face of the chart for keeping a record of the street, cross street, grade, etc., to be filled out for future reference.

The "Trolley Wireograph Instrument" has proved of considerable value to the Puget Sound Power & Light Company in that it provides an accurate means for making records that can be kept systematically, the cost of which is very low when compared with the increased saving in the annual cost of trolley wire maintenance. Nearly 3,000 record charts have been made and some very surprising results obtained. Some of these graphic records were taken at the same location two or three times on different dates for the purpose of studying the successive stages of wear.

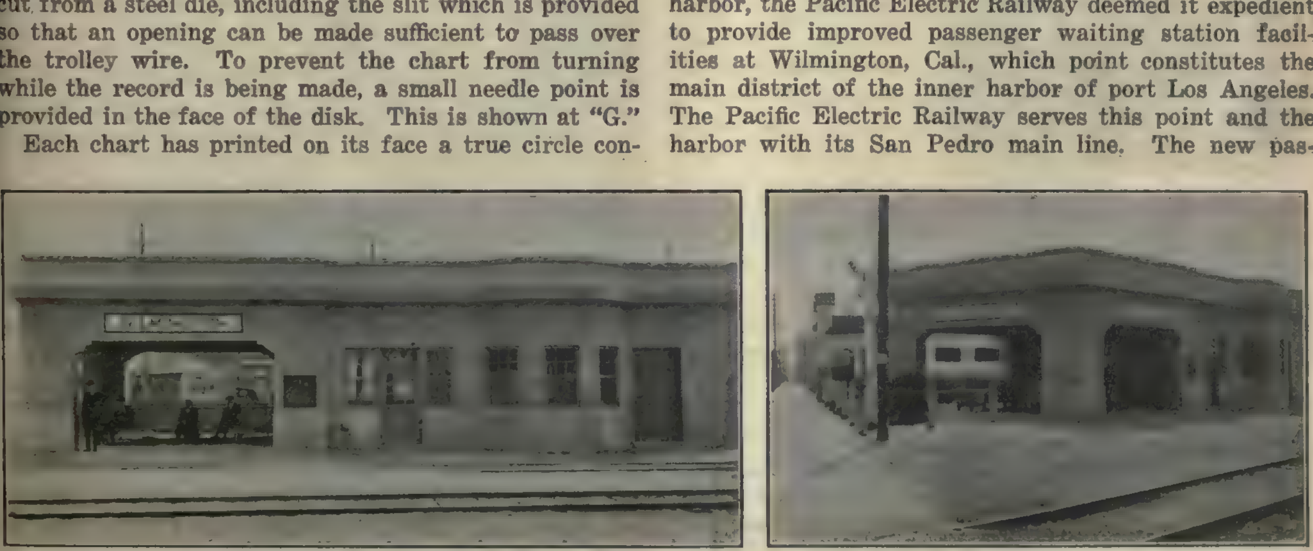
The three charts shown in the accompanying illustration represent typical performances of the instrument.

Attractive Stucco Station

Passenger Waiting Station Constructed by the Pacific Electric Railway at Wilmington, Cal., on the San Pedro Main Line

BY CLIFFORD A. ELLIOTT
Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

IN ORDER to meet the exigencies of traffic, and taking into consideration the rapid growth of Los Angeles harbor, the Pacific Electric Railway deemed it expedient to provide improved passenger waiting station facilities at Wilmington, Cal., which point constitutes the main district of the inner harbor of port Los Angeles. The Pacific Electric Railway serves this point and the harbor with its San Pedro main line. The new pas-



THE PACIFIC ELECTRIC WAITING STATION AT WILMINGTON COMBINES THE ELEMENTS OF SAFETY, COMFORT AND ATTRACTIVENESS senger station, completed last spring, is located at Canal Street, Wilmington.

The new station is modern in every respect, being constructed for both appearance and stability. The foundation and outside walls to a height of 3 ft. above floor level are constructed of concrete. The remainder of the exterior is stucco finish. The station has cement floors throughout. The length of the structure is 62 ft., the extreme height is 16 ft.

Recessed into the front wall, as the view shows, and to left of the main door, is space for a hose rack, containing 50 ft. of 1½-in. fire hose; also, a fire hydrant opening is contained in this pocket. A glass door covers the pocket—to be broken in case of fire. A second fire hydrant has been installed at the rear wall of the station. Also, at the left of the main door an exterior drinking fountain has been provided.

The station consists of an open waiting room, 23 x 24 ft. inclosed waiting room, agent's office, express room and public comfort stations for both men and women. The open type of waiting room is a very popular feature on passenger stations erected by the company, as it appeals to the traveling public on account of the mild California climate. Also, it adds to the artistic element of the structure.

Panel Bending with Shop-Constructed Equipment

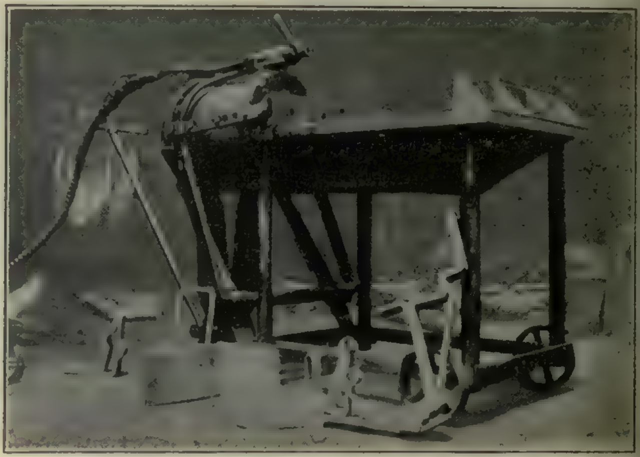
THE accompanying illustration shows the equipment used by the Second Avenue Railroad, New York City, for bending panels for the sides of cars which it is reconstructing. Six panel electric heaters removed from old cars are mounted, face uppermost on a pipe framework. Switches with fuses are mounted on the ends so that three degrees of heat can be obtained in a manner similar to that used in regulating the heat of electric cars. The panel to be shaped is laid on top of the heater, current is turned on and the panel is bent to the required shape by applying water to the top surface. Where portions of the panel are to be left straight no water is applied to this particular part. The workmen soon become skilled in the application of the water to obtain the necessary contour desired.

SHOP-CONSTRUCTED PANEL-BENDING EQUIPMENT

On the London Underground Railways it is said that 80,000 station stops are made daily and the electrical energy absorbed in the normal starting of trains is more than one-third of the total daily output of the generating station. Because of the speed-reducing influence of this large number of station stops the interval between stations on any new line should be widened, according to J. P. Thomas, operating manager of the system, and the diffusion of traffic between stations should be provided for by surface transit. Consideration should also be given to the plan of equipping the stations with four tracks, two in each direction, to allow for one train to load and unload while the following train does the same at an adjacent platform.

Home-Made Bulldozer

THE accompanying illustration shows an inexpensive bulldozer which was constructed in the shops of the Portland Railway, Light & Power Company. An old 12-in. airbrake cylinder was used for operating it and as constructed this makes a very handy tool for the blacksmith shop. The body portion is made of sheet steel and angle iron welded together. The movable head is connected to a rocker shaft so as to keep the two heads always parallel. Nearly any shape and size angle can be bent in this machine up to 1 in. x 6 in. angle iron knees used for trackwork.



INEXPENSIVE HOME-MADE BULLDOZER

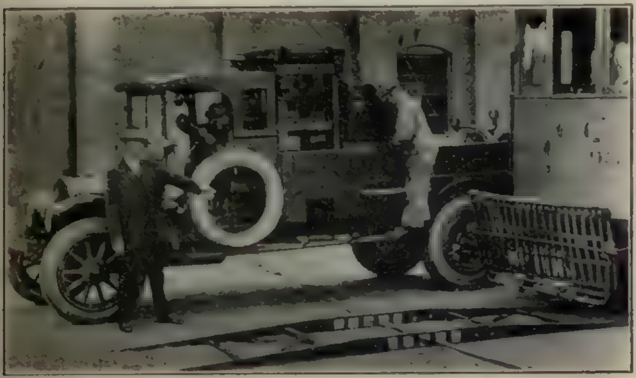
Forest Products Laboratory Desires to Widen Scope of Service

AT THE request of the Association of Wood Using Industries the Forest Products Laboratory, Forest Service, United States Department of Agriculture, has prepared a statement calling attention to conspicuous examples of industrial waste which might be greatly reduced if the Forest Products Laboratory had the facilities for assisting in the actual application of more of the results already obtained in its research. The purpose of the statement is to secure support for such government appropriation as will enable the laboratory to render available to all wood-using industries the wealth of information and knowledge which it has accumulated. This the laboratory is already doing in part, through personal interviews, correspondence, government publications, articles for trade and scientific journals, news and technical notes, instructional courses for trade representatives and special investigations in direct co-operation with industries.

At present nearly one-fifth of the laboratory's appropriation is expended in these directions, but the laboratory management believes that as much money should be spent in spreading the information which it gathers as in the fundamental research itself.

New Truck Has Many Uses for Relieving Emergency Situations

A NEW 2-ton White truck recently placed in service by the Los Angeles Railway Corporation has proved an efficient ally in relieving emergency situations. In the accompanying illustration a temporary bridge has been laid over an obstructing length of fire hose. The truck has also been used in connection with replacing derailed cars, by coupling on to the car with a heavy chain and then by applying power so as to tow the car back to the track.



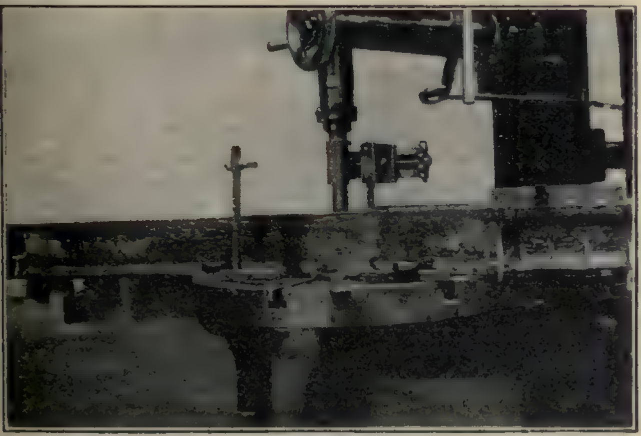
NEW EMERGENCY TRUCK IN LOS ANGELES

The truck is also equipped with a three-section telescope tower designed to facilitate the repair to overhead wires. Other emergency equipment carried includes blocks, tackle, picks, shovels, jacks, crowbars, cables, ropes and lights.

Tool for Facing Heel of Switch

IN ORDER to do away with the expense of making patterns and castings, the Portland Railway, Light & Power Company constructed a tool for boring and facing the heel of a steel switch from steel pieces welded together.

The tool is used in connection with a drill press and the back lash of the press is held up by stiff springs under the center of the tool. The heel of the steel switch which was bored and faced was 7½ in. in diameter and 2 in. deep. An accompanying illustration shows this tool in position during the operation of finishing the switch.



DRILL PRESS ATTACHMENT IN POSITION FOR FACING HEEL OF SWITCH

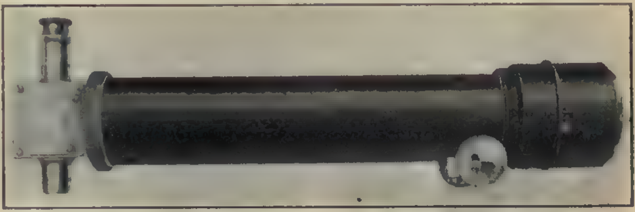
What's New from the Manufacturers

New Lightmeter

A Portable Instrument Designed for the Measurement of Foot Candles, Lamberts, Candles per Square Inch, Candlepower, Coefficient of Reflection, Transmission Factors and for Color Matching

THE accompanying illustration shows a form of lightmeter being manufactured for the Holophane Company by the Keuffel & Esser Company. The direct range of the instrument is from 1 to 15 foot-candles. The photometer head has two slots for inserting absorbing screens, one on the test side of the photometric cube and one on the standard lamp side of the cube. Two absorbing screens are supplied with the lightmeter having transmission factors of 0.1 and 0.01. The range of the instrument with the two absorbing screens is from 0.01 to 1,500-foot-candles. The range can be further increased by the use of additional absorbing screens that can be made to order.

Experience in making illumination measurements in the field has shown that a piece of white blotting paper with the mat surface used to reflect light is the most practical test plate. Ground milk glass test plates when carefully prepared follow the law of diffuse reflection at larger angles to the direction of the incident light than do the blotting paper test plates, but these glass plates require frequent washing under unfavorable conditions and are easily broken. The blotting paper test plate can be discarded when slightly soiled and its cheapness and reproducibility make it ideal for field measurements. A package of twenty-five blotting test plates is furnished with each instrument.



COMPLETE LIGHTMETER INSTRUMENT

In order to make measurements of foot-candles incident on any plane of measurement, the test plate is placed on the plane of measurement and is viewed through the telescope. The milammeter when set on the arrow indicates that the proper current is passing through the standard lamp. The lamp and battery housing is then moved in or out until the two ellipses in the photometric field as viewed through the eye piece match in brightness. The scale reads directly in foot-candles.

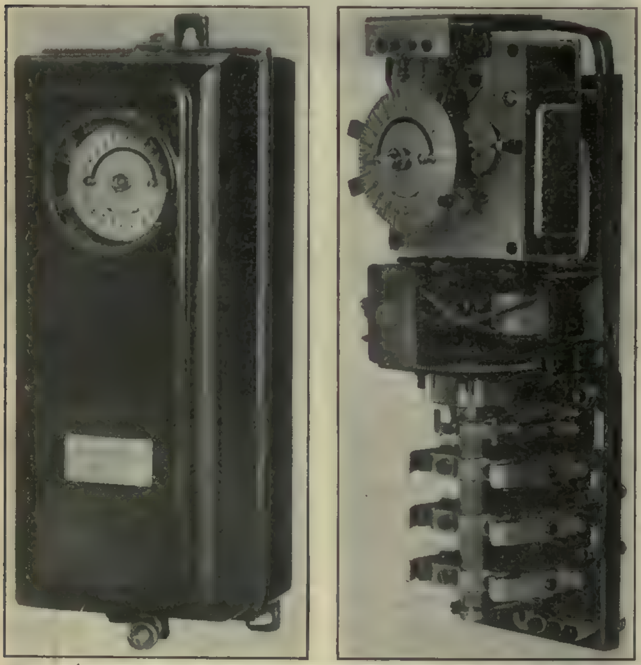
The unit of brightness is the lambert, which is defined as the brightness of a perfectly diffusing surface emitting one lumen per square centimeter. A perfectly diffusing surface emitting one lumen per square foot will have a brightness of 1.076 millilamberts. The lightmeter will therefore read directly in millilamberts by multiplying the scale reading by 1.076. In making brightness measurements the test plate is not used, the surface being viewed directly.

A New Automatic Time Switch

From Switzerland Comes a New Type of Time Switch Interesting for the Engineer Who Is Confronted With Problems of Automatic Electric Current Control

ACCOMPANYING illustrations show a Sauter time switch of 30-amp., triple-pole, self-winding type, which is a Swiss product, the factory being located in Basle. R. W. Cramer & Company of New York, N. Y., are the American distributers. These switches are made in several types and of various capacities, the essentials of design and construction being similar, however, except that in types of capacity exceeding 100-amp. current breaking contacts of an "oil break" type are provided.

The device consists of a quick make and break drum-type switch, operated by a spring which, at each operation, is wound by a small universal motor. The latter is automatically thrown on the line by a lightly acting, small contact switch, operated by the clock dial. The main switch cannot be thrown before its spring is fully wound. The winding of the clock takes place at every operation of the switch, although the energy stored in the spring when fully wound would keep the clock going for four days. The clock mechanism is of substantial construction and has all the refinements found in high precision timepieces. Excessive winding of either spring is impossible. The universal motor is well made and protected against dust and moisture; has carbon brushes and large bearings lubricated by grease cups. The motor runs only a few seconds per operation. The clock movement is completely inclosed and the entire mechanism is mounted in a hermetically closed metal housing. Padlocking or sealing of the housing is possible because of the self-winding feature.



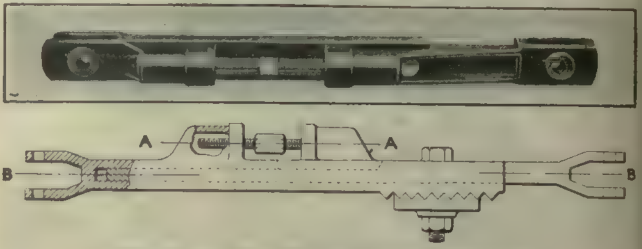
AT LEFT, EXTERIOR VIEW OF AUTOMATIC TIME SWITCH. AT RIGHT, VIEW OF INTERIOR MECHANISM

This type of switch can be used in various types of service where automatic regulation at definite time intervals is necessary, and its use produces increased economy in the control of current. The switch can be used in connection with either light or power circuits, such as station lights, signal lights at crossings, etc.

Detroit Tests New Brake-Rigging Adjuster

A TYPE of brake-rigging adjuster intended to replace the usual form of turnbuckle for taking up slack in brake rigging is being tried out by the city of Detroit, Department of Street Railways. This type of adjuster was designed and patented by Amel B. Broluska.

The adjuster consists essentially of two members which are connected in the brake rigging in a position usually occupied by the turnbuckle. These members have jaws so that the brake levers or rods can be attached. In the accompanying drawing the member at the right slides inside that at the right end and the adjustment is made by turning the screw at the top which is provided with right- and left-hand threads. This screw works in two projections at the top of the principal members. After the adjustment is made, the parts are locked firmly in position and the strain is taken off the adjusting screw by clamping with an additional piece provided with teeth which fit in similar teeth on the upper casting. A bolt passes through the right-hand member and this bottom casting, and so securely locks the various members in position. The left-hand member is provided with a slot, so that locking can be accomplished in any location necessary for proper adjustment.



DETAILS OF NEW BRAKE RIGGING ADJUSTER

Indoor Oil Circuit Breakers of Moderate Capacity

THE Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces the Type "F-11" line of oil circuit breakers. These are moderate capacity indoor breakers, manually operated, non-automatic and automatic, with one, two or three trip coils. A 200-amp., 4,500-volt and a 400-amp., 2,500-volt breaker are made in two or three poles, single and double throw.

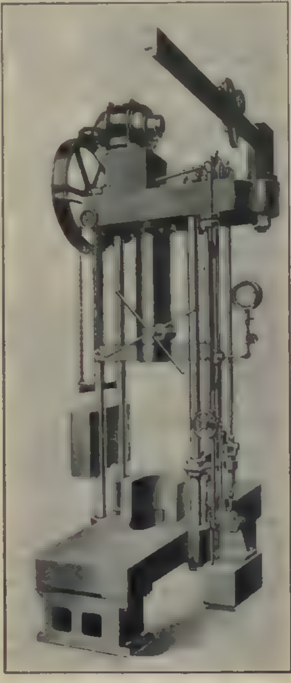
The breaker unit may be mounted on the panel for direct control or on a wall for remote control without change, or on pipe for remote control by the addition of a simple pipe mounting bracket. The same operating mechanism is used for direct panel mounting or remote control breakers.

The breaker opens by gravity, assisted by tension springs, and is equipped with bumpers to absorb all shocks of opening. The open position is maintained by gravity. The tanks are removable without the necessity of disturbing operating mechanism or contacts. There is ample air space at the tank top to allow for gas expansion. Poles are isolated in individual cells by insulated tank liners and partitions.

At the bottom of the stationary contact stud are self-aligning fingers. These fingers have flared surfaces that guide the moving contact during the closing stroke. The most important function of these flared surfaces, however, is to take the arc incident to opening heavy short circuits. This arc is drawn between the flared surfaces and the top edge of the moving contact, leaving the flat surfaces that are in contact when the breaker is completely closed smooth and clean to carry normal current of the breaker.

New Type Press

THE Watson-Stillman Company, New York, has brought out a new press designed for the many operations of forcing, pressing and bending in electric railway machine shops. Its use provides a rapid and convenient means of pressing axle and armature bearings in and out of their housings, as well as for pressing pinions and collars on and off their shafts. On account of its wide bed, the press is adaptable to many operations of bending and straightening.



NEW 75-TON PRESS

The press is of the reversed cylinder type, having the ram movement from the top downward. The pump is only required for the actual pressure application, the hand wheel as shown providing a means of bringing the ram quickly to and from the work, obviating the necessity of waiting for the pump to move the ram through the idle part of the stroke.

A "U" piece hinged to one of the columns of the press may be easily swung into the center of the press or to one side as required. The jib crane mounted on the top is furnished with a trolley so that a chain hoist may be attached for easily handling the work into and out of the press. A hole is provided in the bottom platen for receiving the shafts, etc. The press illustrated shows a motor-driven pump. The drive can be either by belt through tight and loose pulleys or by direct attached constant-speed motor.

A gage is provided which indicates the pressure on the ram in pounds per square inch and the total pressure in tons. The pump is a two-plunger type and the entire control of the press is through a single screw stem valve. The bottom platen, top platen, cylinder and crane bracket are made of open-hearth steel castings; the ram and rods of machinery steel, and the cylinder is copper lined. The press illustrated is built in a capacity of 75 tons with a ram movement of 21 in. The bottom platen has a total length of 72 in.

Improved Method of Insulating Motor Cases, Field Coils and Armatures

THE L. Robinson Corporation, 8-10 Bridge Street, New York, N. Y., has worked out an automatic insulating flow system for coating the inside of railway motor shells and impregnating field coils and armatures. This company makes a specialty of insulation varnishes, compounds, japans and protective coatings, and it is willing to co-operate with railways that desire to perfect their method of applying these insulating coatings. The method most generally used at the present time consists of dipping the complete motor shell. In such cases it is necessary to scrape off the coating from the outside of the shell, which entails additional labor. Also, except in a few instances, these methods have not been devised with a view of economy in shop space and with facilities to keep the labor down to a minimum.

The automatic insulating flow system provides a method for applying insulation to the inside of motor cases, to the field coils and armatures that is economical in the amount of material used and reduces the labor in handling as several movements are eliminated. Through careful design it is also possible to keep the part of the shop where this work is done in a clean condition, which also reduces the fire hazard to a minimum.

The insulating material used in this treatment is of a nature thoroughly to fill and saturate the assembled armature and field coils, thus filling up all shrinkage cracks in the insulation and winding. The various individual coils of the armatures are thoroughly bonded together and are held in position by the compound and the work can be accomplished without removing field coils from their cases.

Mechanical Engineers Favorable to Use of Pulverized Fuel

THE American Society of Mechanical Engineers recently conducted a canvass to ascertain present professional opinion as to the practicability of using pulverized fuel in power plants. According to the engineers the use of such fuel is warranted not only on account of money saving, but because of its effective help in solving the labor problem.

As to the use of this fuel in existing plants, H. D. Savage, Combustion Engineering Corporation, said that with the exception of the Lakeside station of the Milwaukee Electric Railway & Light Company, the River Rouge plant of the Ford Motor Company and two boilers of the St. Joseph Lead Company, more than a dozen "Lopulco" installations had been made in existing plants. "Powdered-coal installations," he said, "are so flexible in their application as to make it generally possible to apply the system with but slight change in the existing conditions. This is especially true since it is now thoroughly proven that it is not necessary in all cases to dry the coal before burning."

It was the feeling of the engineers whose statements are included in the symposium that the financial and labor considerations were not the only ones in this connection. An important point is the additional capacity which results; still another is cleanliness.

As to cleanliness, W. J. Santmeyer, of the Puget Sound Light & Power Company, says, "Early last year we painted white the main part of a station where we use pulverized coal. This plant has remained clean."

The United States Department of Labor, through the Bureau of Labor Statistics, has completed the compilations showing changes in the retail cost of food from Oct. 15 to Nov. 15 in nine principal cities in the United States. There was a decrease in six of these cities and an increase in two. The year ended Nov. 15, 1921, as compared with 1920, showed decreases of from 20 per cent to 23 per cent. As compared with the average cost in the year 1913, the retail cost of food on Nov. 15, 1921, showed an increase of from 44 to 58 per cent. The cities considered were Chicago, Newark, Cincinnati, Milwaukee, Omaha, Indianapolis, Houston and Portland, Me.

Indiana Association Meets with the State University

President Henry Urges Revision of Utilities Act to Include Regulation of Trucks and Buses Using Highways for Commerce

ELECTRIC railway men played a prominent part in the second annual meeting of the Indiana Public Utility Association, held Jan. 14 on the campus of Indiana University, Bloomington, Ind., upon invitation of the school of commerce and finance. Charles L. Henry, president of the association, addressed a convocation of all students of the university and presided at the association meeting. Arthur W. Brady, president Union Traction Company of Indiana, read a very interesting paper on the subject "Utilities and the Public."

Mr. Henry in his address made a plea for the extension of the powers of the public service commission, to cover the operation of automobiles and trucks on the highways for commercial purposes. He referred to the act of the Indiana Federation of Farmers' Associations, which adopted resolutions recently demanding that the trucks and automobiles be compelled to help maintain the country roads they are wearing out.

The sessions of the association were held in connection with the school of commerce and finance, whose professors and students were present to take part. Dean W. A. Rawles, of the school, was on the program with a paper discussing the value of business training in the university. This is the first time on record when a great state university and an association of utility owners and operators have met together to arrange a program of educational value. University professors and students, commenting on the program, say that it was worth a great deal to them. Dean Rawles, discussing the question, said:

"The public utilities constitute one of the most important industries of the country. Their activities concern nearly everyone. Upon their service the people in their daily lives are dependent for their comfort, convenience and safety. Hence, there is a universal interest in this business. A mutual understanding of the rights of the public and the problems of the utility companies should eliminate friction."

Some of the remarks from Mr. Henry's presidential address follow:

"The Public Service Commission of Indiana today has jurisdiction only over the electric railways, gas producing companies, electric light and power companies and telephone companies. It will at once be recognized that there are many others that are performing a public service for compensation which are not included in this list. In that regard, the law needs a very thorough, careful and complete revision. I will not undertake to enumerate all the things not now included under the jurisdiction of the commission which should be, but I desire to call attention to one class of utilities that should be under the control of the commission, and at the same time required to pay the state a reasonable compensation for the privileges which they enjoy.

"In the old days of toll roads a man had to pay 2½ cents per mile toll for the privilege of driving a two-horse wagon, with the probable capacity of about one ton, over the road. Today we have going up and down our recently improved highways, trucks carrying loads of five tons and upward which greatly damage the highways, without paying anything for the privilege granted them and without paying taxes in any community, to any considerable amount whatever. If the five-ton trucks were today put on the same basis as the old toll charges, for one hundred miles a day at 2½ cents per mile per ton, they would pay to the state $12.50 each day for the privilege they are enjoying, which would go very far toward the expense of keeping up the highways now being built at public expense.

"The same kind of toll for buses and autos could be enforced under the kind of tax regulation that has been enforced by the general government, compelling the bus owners, the auto owners and the truck owners, to report the amount of travel; or it might be fixed by a graded license which the owner or the user of the vehicle might be required to pay. Such an arrangement would be perfectly just and fair. These people are as much operators of public utilities as the steam railroads or the electric interurban lines of the State, and they should not be allowed to wear out our highways without compensation."

New York Electric Railway Association

ACCORDING to President W. O. Wood, of the New York Electric Railway Association, present indications point to a good attendance at the mid-winter meeting of the association, to be held at the Hotel Astor on Jan. 24. The program includes topics of interest to all branches of the industry, executive, transportation, engineering, accounting and legal, and it is hoped that the attendance will include representatives from each branch, as well as from regulatory commissions.

The technical sessions will begin at 10 a.m., and, with an intermission of one hour for lunch, will continue during the day. The papers to be presented are as follows:

"One-Man Car Operation with Double-Truck Cars"; (*a*) reason for use of double-truck cars, (*b*) application of turnstile to cars, (*c*) application of safety devices to cars.

Paper by H. S. Sweet, Engineer of Equipment, New York State Railways, Utica, N. Y.:

"Workmen's Compensation Claims a a Continuing and Increasing Liabilit to Railway Companies."

Paper by Marten E. Burke, assistan general attorney, Interborough Rapi Transit Company, New York City.

"One Year's Experience with Cost of-Service Plan in the City of Rochester, N. Y."

Paper by Charles R. Barnes, commissioner of railways, City of Rochester N. Y. (formerly electric railway expert Public Service Commission, Second District, State of New York).

There will be an informal dinner i the evening. The speakers will includ Hon. Fred S. Purnell, member of Congress from Indiana, who will speak o "The Turn of the Tide in America Problems of Today." There will b singing by the Manhattan Quartet.

Anti-Strike Law Predicted

SPEAKING at the third annual dinner of the New York Railroad Club held Dec. 15, Ben. W. Hooper, forme Governor of Tennessee and now vice-chairman of the United States Railroa Labor Board, declared that the surviva of the country depended on the solution of the issues of capital and labor The unionized railroad worker, Governor Hooper said, should understan that morally, at least, he has no righ to tie up the roads and inconvenienc the general public. If this is not now the law, it ought to be, and it will be adding that if such an anti-strike law came into being there should be constituted an absolutely impartial tribunal to decide the question between the employers and the employed.

The problem in this country today is not how to stamp out and destroy organized labor, but how to deal with its just demands fairly and humanely and how to curb its unjust demands and control such of its activities as threaten the public welfare. He said:

"Friendly as I am to theory and principle of organized labor, I am profoundly awed when I contemplate its possibilities for evil. On the other hand, if organized labor confines its efforts to the legitimate advancement of a just and reasonable wage, the establishment of desirable working rules and conditions, the maintenance of an increasingly good standard of living and preservation of the political and civil rights of labor, then will organized labor not only serve its own interests, but it will constitute one of the bulwarks of the American Republic."

The people of the United States, he pointed out, must have efficient and uninterrupted railroad service. The employees must share with the carriers the execution of this public trust. When a man enters the employ of the railroad, and every day that he is so engaged, he should understand that in a high sense he is serving the public. He should understand that whatever rights men may have to strike and tie up a strictly private business, they have no such right, morally at least, to tie up the railroads and destroy the property, business health, comfort and lives of innocent men, women and children. The millions of dollars wasted by both sides in industrial warfare should be saved to enlarge the income of the carriers and wages of employes or to diminish the rate paid by the people.

Reviewing the board's twenty-one months of work, Vice-Chairman Hooper recounted its accomplishments, and bringing his review down to the threatened national rail strike threat, said that while this may have been an opportune time to fight the labor union, the price of this fight would have staggered the nation. This country has never experienced a general railroad strike, and but few men have any adequate conception of the ruin and misery it would bring to the people.

American Association News

Committee Busy on Applied Psychology

THE T. & T. Association committee on personnel and training met in New York City on Jan. 18 and blocked out a definite program for this year's work. The committee had been instructed by the executive committee to carry out the recommendations of last year's personnel and training committee, particularly with reference to mental tests of applicants, and training of one-man car operators.

In general the program was divided into four parts: (1) First elimination tests, including general observation of applicant and preliminary mental rating; (2) formal application, for which a suggested standard form will be prepared; (3) second elimination test, involving oral questions and answers to permit a general "sizing up" of applicant and an imparting to him, informally, of the ideals of the company as to service; (4) medical examination and final mental tests, for which specifications will be drawn and a suggested record form prepared. The committee also plans to suggest a standard card form for permanent filing of applicants' and employees' records.

Dr. John Leeming was appointed chairman of a sub-committee to secure information on the functions required to be performed by motormen and conductors and the qualifications needed for the proper performance of these functions. His committee will also frame sets of mental tests for consideration at the next main committee meeting.

Chairman J. E. Wayne undertook to secure sample forms for application, medical examination and permanent record and to investigate the subject of one-man-car operator training. All members of the committee are to send Dr. Leeming their detailed suggestions for his sub-committee, forwarding copies to all other members of the main committee.

In order to focus its thinking in the preparation of its report, the committee formulated its plans tentatively in the following statement: "Basing our efforts on the work of last year's and preceding committees, we aim primarily to suggest concrete detail of physical examinations and mental tests as a step toward the development of a standard of procedure in selecting and training transportation department employees."

The meeting was attended by J. E. Wayne, vice-president York Railways, chairman; F. L. Butler, Atlanta, Ga.; Arthur Gaboury, Montreal, Que. (sponsor); Dr. John Leeming, Chicago, Ill., and H. H. Norris, ELECTRIC RAILWAY JOURNAL, members of the committee. There was also present by invitation, N. L. Hoopingarner, City Club, New York City, an expert on applied psychology. The next meeting of the committee will be held in March.

Joint Meeting of One-Man-Car Committees Held

THE committee on one-man car operation of the Transportation & Traffic Association and the committee on unification of car design of the Engineering Association held two-day sessions at association headquarters in New York on Jan. 12 and 13. Individual committee sessions were held the first day and the second day was devoted to a joint session. Those present for the committee on one-man car operation included: C. E. Morgan, Brooklyn City Railroad, chairman; C. W. Kellogg, Boston, Mass., and D. A. Scanlon, Akron, Ohio; and for the committee on unification of car design: H. H. Adams, Chicago Surface Lines, chairman; H. A. Benedict, Newark, N. J.; J. A. Brooks, Philadelphia, Pa.; John Lindall, Boston, Mass.; G. L. Kippenberger, St. Louis, Mo., and Victor R. Willoughby, New York City.

The T. & T. Association committee went over the city operating rules and made the revisions and additions considered necessary to care for the conditions resulting from one-man operation. Operating rules for suburban service will be taken up at a future meeting.

The committee on unification of car design discussed various phases of car construction and considered condensed data on dimensions of double-truck cars for city service presented by the chairman. This information was tabulated from the returns from a questionnaire sent to the members of the committee. It included various governing dimensions for such double-truck cars. The data were classified under single-end motor cars, double-end motor and trail cars, front-entrance and center-exit motor cars, center-entrance, motor and trail cars, and end-entrance-and-exit and front-exit motor cars.

An analysis of some of the principal controlling dimensions showed the committee that the variation in many instances was small and there appeared to be no great obstacle in deciding on a uniform design that would be satisfactory in all cases. After discussion, the committee selected certain types of construction and dimensions that could properly form a basis for car design and furnish a starting point for further investigation and discussion. These were confined to design of double-truck city cars where transverse seats were used. Tentative dimensions for post centers, width over posts and extremes widths were agreed upon as were also some details of design in connection with lower and upper sash.

The number of windows, which also governs the seating capacity of the body of the car, was also determined in connection with the desirable motor capacity for this type of service. Other important considerations in design, such as platform length, maximum height of first step with a specified diameter of wheels, and consideration as to when flush and drop platforms would be necessary were also outlined. The desirable height of window opening was left for decision after an investigation which is to be made by Messrs. Adams and Lindall. A tentative design covering the suggestion is to be drawn up and stress diagrams are to be made by Mr. Willoughby.

At the joint session of the two committees held Friday, the essentials of one-man car design which appeared necessary from an operating standpoint were discussed in detail. The committees agreed on certain essential devices which should be incorporated on all cars operated by one man. The committee also discussed the present tendency toward the use of a car somewhat larger than the present safety car operated by one man, and also the demands for a still larger capacity car which could be operated by either one man or two men as traffic conditions require. In these larger cars, the committee considered it desirable to provide liberal width of aisle and passageways so as to facilitate the movement of passengers in interchange and toward the rear of the car.

This joint meeting of the two committees brought out many valuable suggestions which will be used in future consideration and discussion.

Hotel Accommodations at Indianapolis

THE official headquarters of the American Association during the Midyear Meeting, to be held in Indianapolis on Feb. 28, will be the Hotel Claypool. Reservations of rooms should be made promptly. The following hotels are conveniently located with respect to headquarters and are recommended as satisfactory: The Lincoln, across the street from the Claypool; the Severin, and the Washington.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Wages Cut in Milwaukee

Reduction Averages About 8 per Cent—Motormen Have More Difficult Job than Conductors

As a result of negotiations between the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., and committees representing the company's employees as organized in the Employees' Mutual Benefit Association, the employees have agreed to a reduction in wages which will average about 8 per cent. The cut became effective on Jan. 1, 1922. In terms of cents per hour the reduction will range from 2½ to 14 cents. Trainmen now in the employ of the company will be cut approximately 5 cents an hour.

Under the wage scale in effect during 1921 motormen and conductors on city lines who had entered the service prior to May, 1921, were receiving 55 cents an hour during the first year of service, 58 cents during the second year, and 61 cents during the third year and thereafter. The wages of these men will be cut 5 cents an hour; that is, to 50, 53 and 56 cents, depending upon length of service.

In hiring trainmen subsequent to Jan. 1, 1922, the company plans to differentiate between motormen and conductors, the idea being that because of constantly increasing responsibility and other contributing factors the motorman has the more difficult and important task to perform. It is also planned to abolish the term "conductor" and instead to use the term "collector."

With this in mind the scale of pay for men hired subsequent to Jan. 1, 1922, will be as follows: City motormen, 45 cents an hour during the first year of service, 47 cents the second year, 49 cents the third year and thereafter; city collectors, 40 cents during the first year of service, 42 cents the second year and 44 cents the third year and thereafter. The wage scale of interurban motormen, conductors and collectors will continue to be 2 cents an hour higher than that of city men.

In so far as new men are concerned, however, here also a differentiation will be made between the work of motormen and collectors. One-man car operators will continue to receive 5 cents an hour more than other city trainmen. The largest hourly cut, that of 14 cents an hour, will be made in the wages of common labor. Of course, most of the employees, including practically all of the transportation department employees, will continue to participate in the prevailing profit-sharing plans, which will continue to give them monthly compensation additional to that received as wages.

In a statement issued just prior to the conclusion of negotiations for the wage cut, the president of the Employers' Mutual Benefit Association pointed out that in April, 1919, the association entered into a general labor contract with the Milwaukee Electric Railway & Light Company and its associated companies. Under the terms of this contract the companies agreed to deal collectively with the employees concerning wages, hours and working conditions and to adjust wages semi-annually in accordance with the increase or decrease in cost of living as shown by an agreed index number.

Wages Adjusted From Time to Time

The scales of wages in the various departments of the company have been adjusted upward from time to time since the general labor contract was entered into. These increases were covered for each department or division or a department by supplemental agreements running for definite periods. All of the supplemental agreements expired on Dec. 31, 1920. The association was able to negotiate, however, a continuation of wage schedules then in effect on the showing, that it was able to make, as to the treatment of wage scales by other utilities and by the steam railroads in the light of local conditions.

The association at this time pointed out that its members had suffered a longer delay as compared with employees in other industries in getting wage increases during the period of the war. For that reason the company continued the then existing wage scale for employees then in service until Jan. 1, 1922, when it served notice on the association that it wanted to negotiate a reduction in wage rates. Negotiations were conducted which resulted in a cut in the company's pay roll above described.

New Equipment to Provide Competition with Buses

Judge John M. Killits recently authorized J. Frank Johnson and Harry A. Dunn, receivers for the Toledo & Western Railroad, Toledo, Ohio, to order new equipment for suburban traffic.

The plan is to provide competition for interurban bus lines now operating parallel to the line. The receivers also want to give better service to a community that is providing operating revenue for the company from electric light and power business along the right of way.

When the new equipment for suburban traffic reaches Toledo the passenger tariffs will be reduced about 40 per cent, the receivers have announced.

Houston Franchise Advanced

$1,200,000 to Be Spent Under Grant Extended for Sixteen Years—Seven-Cent Initial Fare

Final passage and adoption of the new railway franchise in Houston, Tex., would appear to be assured. Under the new grant the Houston Electric Company will receive what is a virtual sixteen-year extension of its present franchise, in return for which the company agrees to spend $1,200,000 within two years for additions, replacements and betterments to its city service.

The ordinance extending the franchise was passed on first reading during the week ended Jan. 14 and will come up for second reading at the next meeting of the City Council, and one week later will come up for third and final reading and final adoption.

Under the provisions of the new franchise the railway binds itself to spend within two years at least $1,200,000 for additions, replacements and betterments to its service. The extension is forfeitable if the company fails to spend this sum.

In addition to its present gross receipts tax, the company is to pay the city $500 for the extension. When the extension has expired the city may purchase all, but not less than all, of the traction property upon the payment of the "fair valuation thereof." Universal transfers are provided for.

The company agrees to pay not in excess of $5,000 each year to be used to employ "competent persons" to work with the ex officio public service commissioners.

A penalty of $100 a day is provided if the company fails to furnish efficient service at reasonable rates, or fails or refuses to maintain its properties in good order, and the company recognizes the right of the city to pass penal ordinances for the enforcement of provisions of this section.

Attached to the franchise ordinance is an ordinance prescribing the fares to be charged. These are:

Seven cents for persons over twelve years, or four car tickets for 25 cents. Children between five years and twelve ride on a child's ticket, sold two for 7 cents; children under five free. Policemen and firemen in uniform, free. Students not more than seventeen years old, attending academic, public or private schools of high school grades or lower can buy books of twenty tickets for 70 cents for use during school months.

New fares take effect on the date the company files its acceptance of the extension of the franchise, which must be within thirty days after the franchise ordinance is put into effect.

Politicians Active in Chicago

As a Result Messrs. Insull and Blair Both Appear Before Local Transportation Committee With Offer to Sell to City—"L" Comes in for Special Attack.

Chicago's City Council has started a fight on the elevated lines by passing a resolution ordering Mayor Thompson to take steps at once to bring the rate of fare down to 5 cents, as fixed by contract, and to obtain better service. Up to this time, the anti-traction activities of the city hall have been centered upon the Chicago Surface Lines, but the local transportation committee's chairman is the leader in a demand to know why the "L" has been favored by the city administration.

AS A SPECIFIC item of contention, the question has been asked why the Oak Park "L" has not been forced to pay $197,694 owing to the city for six years for its share of the cost of the Lake Street bridge. There have also been numerous letters published in the newspapers from people complaining about the service and showing a very antagonistic attitude.

To defend itself against some of the untruths that have been spread broadcast, the elevated lines have been posting short informative statements in the elevated cars and running newspaper advertisements. In this advertising, thus far, the Chicago Elevated Railroads has compared the service given in Chicago with that on other rapid transit systems, showing that the passengers per car mile, (intended as a measure of the congestion) is 3.68 in Chicago, 6.09 on the New York subway and 5.65 on the New York elevated. It is also pointed out that the average speed of express trains in rush hours is 16.89 m.p.h. on the Chicago elevated lines, 16.80 m.p.h. on the New York subway and 16.29 m.p.h. on the New York elevated. In another advertisement the disposition of the fare which, for the nine months ending Sept. 30, 1921, averaged 9.8 cents per passenger, is given as follows:

Labor	5.25 cents
Materials	0.71 cents
Power	0.78 cents
General and miscellaneous	0.50 cents
Replacement reserve	0.27 cents
Taxes	0.71 cents
Rentals	0.22 cents
Total	8.44 cents
Average fare	9.28 cents
Operating costs	8.44 cents
Left for return on investment	0.84 cents

It is pointed out that this return is at the rate of 2.73 per cent per annum on the valuation of $86,250,000 placed upon the elevated railroads by the Public Utilities Commission in January, 1921, after an appraisal of the properties.

MR. INSULL READY TO SELL TO CITY

The reason the Oak Park Elevated has not paid its share of the cost of the Lake Street bridge is explained by showing that the operating deficit on this road was $39,633 in 1918, $123,604 in 1919, $206,037 in 1920 and $113,989 for eleven months of 1921. The city did not wish to accept receiver's certificates in payments of its claims, and therefore the Oak Park "L" is paying the city at the rate of 5 per cent annually on the deferred payment.

Samuel Insull, chairman of the board of directors of the Chicago Elevated Railroads, appeared before the committee on local transportation last week and said that the elevated companies were ready to listen to any reasonable proposition that may be made by the City for purchasing or taking over the lines. Interchange of business between surface and elevated lines or the unification of all of these and a subway, if built, into one system, were urged and recommended by Mr. Insull.

SUBWAY DOWNTOWN FAVORED

He favored the construction of a subway through the downtown district as soon as it can be built. This would be the first step in developing the rapid transit system. Mr. Insull called attention to the report of the Chicago Traction & Subway Commission. This, he said, formed excellent material on which the committee could begin the working out of improved transportation for the people of Chicago. He said the report was as good to-day as it was when written four years ago. He thought subways should be built by the community and that he was not opposed to the creation of an agency, such as the Sanitary District, to carry out the work, presumably referring to Mayor Thompson's efforts to create a traction district. It was his belief that the capacity of the surface and elevated lines could be tripled by joint operation, including certain re-routing of surface lines, extension of elevated platforms, etc. He said he thought it would be impossible to work out any scheme of final settlement without legislation and he doubted the wisdom of submitting any definite plan to the committee, as this ought to be left to a committee of prominent engineers not interested in the local traction systems.

MR. BLAIR ALSO FOR UNIFICATION

A few days later, Henry A. Blair, president Chicago Surface Lines, appeared before the local transportation committee and laid before it a plan by which he believes the city can secure a rapid transit subway, the unification of all transportation facilities and ultimate acquisition by the city of the surface lines, elevated roads and subways. Like Mr. Insull, he urged that the traction problem be taken out of politics and that those interested get down to business. Mr. Blair's plan would provide for what is virtually a service-at-cost franchise, made probably for a twenty-year term, whereby the rate of fare would automatically be adjusted up or down to fit changing conditions.

Mr. Blair would have joint operation of the surface, elevated and subway railway facilities by the companies and the city, under the management of a board of control consisting of four representatives of the railways and three of the city. The plan contemplates the acquisition of the properties by the city of Chicago by outright purchase at any time during the life of the agreement, or by gradual amortization of the capital account of the companies out of the city's share of the earnings.

It is proposed that when the city's share in ownership, through this amortization plan, amounts to 50 per cent of the total value of the property, the city may take it over subject to the unamortized portion of the capital account of the companies and the stipulated annual return thereon.

It is contemplated that the companies should receive a fixed annual return for the use of their properties of 7 per cent interest on the then unamortized portion of the capital account. All residue receipts, after payment of operating expenses, maintenance of the necessary reserve funds and the annual stipulated return on the capital account of the companies, would be set aside by the board of control for the account of the city and be applied by the board to new construction and amortization of the capital account, so that within a reasonable time the city might acquire ownership of the properties free from debt.

8,861,028 Fewer Passengers in St. Louis

Revenue of United Railways, St. Louis, Mo., in 1921 was $656,784, or 3.26 per cent less than in 1920, according to a summary given out by A. T. Perkins, manager for the receiver. In 1921 the revenue passengers totaled 282,447,190 as compared with 287,405,837 the previous year, a decrease of 3.26 per cent in numbers. Transfer passengers in 1921 totaled 150,562,354 as compared with 154,464,735 in 1920, a falling off of 2.53 per cent. The aggregate decrease was 8,861,028, or 2 per cent in the passengers carried.

Travel began to fall off early in the year and continued steadily to decrease until December when there was a slight upward trend toward normal. During the year the loss was principally on lines serving the industrial districts. Saturday and Sunday pleasure travel showed a heavy loss. The total passenger revenue in 1921 was $19,457,015, as compared with $20,113,779 in 1920. The fare is 7 cents straight for adults and 3 cents for children.

January receipts so far are slightly better than the December record, indicating a slow process towards recovery. Manager Perkins believes the increase will continue, and is preparing to ask the Federal Court to grant permission for the construction of fifty new motor cars this year.

Steel Versus Wooden Cars

Speed Control System to Be Tested for Use in Rapid Transit Service in New York

The investigation by the New York Transit Commission into the collision which occurred on the Ninth Avenue elevated structure on Dec. 30 has brought out some interesting facts relating to the life of wooden cars, their safety compared with steel cars, and the weight and construction of both types of cars, and the possibility of installing safety devices to prevent accident.

In this investigation the commission has devoted its efforts more particularly toward finding methods for preventing similar accidents in the future. In the testimony presented relating to the cars which are now being operated on the elevated lines in Manhattan and Brooklyn, it was stated that the Interborough Rapid Transit Company is now operating a total of 2,213 elevated cars, 721 of which are trailers, and the Brooklyn Rapid Transit Company, 917 cars, of which 269 are trailers. Seventy-eight of the trailers used by the Interborough were purchased in 1878, so they have been in service for forty-three years. The oldest motor cars in use consist of 60 purchased in 1881. In Brooklyn the cars which have seen the longest service consist of 60 trailers which were built by the Pullman Company in 1884. All of these cars were used in steam service with the dummy engine originally used on the elevated structures and were remodeled and equipped for electric service at the time of the electrification of these lines. The first electric train was run on the Manhattan Elevated Nov. 22, 1900. The accompanying table gives information regarding old types of trailers and motors cars with the year in which they were purchased.

Testimony given by the various railway engineers before the Transit Commission indicated that in addition to the large financial outlay necessary to replace the wooden cars with steel cars, there would also be an additional expense for reinforcing the present elevated structure and in some cases it would be necessary entirely to rebuild it. The comparative weights given by George H. Pegram, chief engineer of the Interborough Rapid Transit Company, were that the all steel cars now used in the subway average about 85,000 lb. light. Composite cars used in Second Avenue and Third Avenue elevated express service weigh 73,000 lb. unloaded, while the wooden cars in general use on the elevated lines weigh 68,000 lb. Mr. Pegram also stated that in order to get a steel car which could be operated on the elevated without reconstructing that structure would necessitate a reduction in strength of the car frame so that the wooden car would be much safer.

In the case of steel vs. wooden cars, Mr. Pegram said in reference to the comparative safety in collision, the wood type of construction had a greater cushioning power for absorbing impact.

Testimony of other experts indicated that there would be more liability of the steel car being thrown from the elevated structure in case of a collision than there would if the wooden type of construction were used. The advantage of steel cars for this service lies in their fireproof construction, and except in care of fire it was generally considered that the wooden car was just as safe. In regard to the fireproofing of wooden cars, testimony indicated that present methods were not satisfactory and that the present fireproofing consisted of use of asbestos underneath and copper on the sides of the car. The estimated cost for replacing present rolling stock with steel cars is about $7,000,000.

ROLLING STOCK ON ELEVATED RAILWAYS IN NEW YORK

Interborough Rapid Transit Company

Year	Trailers	Motors	Total
1878	78	....	78
1879	143	....	143
1880	45	....	45
1881	40	60	100
1882	71	....	71
1885	43	....	43
1886	...	4	4
1887	...	233	233
1891	...	96	96
1893	...	73	73
1902	8	43	51
1903	...	306	306
1904	99	476	575
1907	...	82	82
1908	115	....	115
1909	19	....	19
1910	...	59	59
1911	60	20	80
1912	...	40	40
Total	721	1,492	2,213

Brooklyn Rapid Transit Company

Year	Cars	Year	Cars
1884	82	1900	5
1887	102	1901	50
1888	78	1902	118
1889	47	1903	100
1891	18	1905	100
1893	78	1907	100
1898	44		
Total			917

Frank J. Sprague was among the experts called in to give information in regard to signal devices and a speed control system for trains. He told of the automatic train control system which he had invented and of tests which soon are to be made by the New York Central Railroad. Testimony by the operating company's engineers and those of the commission indicated that one of the prime essentials of such a signal control system would be provision that trains could close in on each other at reduced speed instead of forcing them to come to a stop. The very short headway operated on New York lines during peak periods makes it inadvisable to use any system which requires trains to stop with fixed distances between them, as this would slow up transportation and reduce the capacity of the road. The recommendation of the commission was that tests of various signal control devices be made in an endeavor to develop a system which would be satisfactory for the service conditions to be met.

Transit Law Valid

Commission Act Passed at Last Session of New York Legislature Upheld by Court of Appeals

In a unanimous decision rendered on Jan. 17 the Court of Appeals of New York held that the Transit Commission act passed by the Legislature of 1921 was constitutional and that the Board of Estimate and Apportionment of New York City must hand over to the Transit Commission the sums it had asked for from the board, amounting to $360,895.78 and $1,083,327.

The Board of Estimate declined to honor these requisitions, and the Transit Commission applied to the Appelate Division, First Department, for an order requiring the board to make such an appropriation. Again the board refused, and took the case to the Court of Appeals, which has now upheld the constitutionality of the act. It is understood that the case will be further appealed to the United States Supreme Court.

Judge Chester B. McLaughlin wrote the opinion of the court, in which Chief Judge Hiscock, and Judges Pound and Andrews wholly concur, while Judges Hogan, Cardozo and Crane concur in the result.

Judge McLaughlin selected four of the chief points raised by the city of New York and centered his argument against them. He first took up the charge that the Transit Commission act violates Article XII, Section 2, of the Constitution.

Judges Hogan, Cardozo and Crane concurred in the result of Judge McLaughlin's decision on the ground that the Transit Commission act, even if it could be held unconstitutional and void in some particulars or contingencies, is not unconstitutional and void in its entirety; that Section 14 of the act imposing upon the Board of Estimate & Apportionment the duty to honor the requisition of the commission, and vesting the Appellate Division with jurisdiction to enforce compliance with that duty is a valid exercise of legislative power, and that the orders under review are, therefore, right and must be affirmed.

The dissenting judges reserve their judgment on the question how far the rights of the city of New York in railroads which it owns may be divested or modified under Article VI of the act until that article has been passed upon in conformity with Article VII, Section 3, of the Constitution of the State, since a decision as to the scope of the last mentioned section is not necesary to the determination of the appeal. They held that questions involving "city rights" may be affected by circumstances and contingencies which are now only imperfectly disclosed.

The act creating the new commission, in addition to amending the Public Service Commissions law in certain respects, and in addition to vesting in the Transit Commission certain regulatory functions, and all the powers and duties under the Rapid Transit act of 1891, as amended, vests in the Transit Commission, by Article 6, the right and duty to prepare a plan of readjustment for the relief of the emergency which is declared to exist, the new plan to accomplish three purposes.

1. The combination, rehabilitation, improvement and extension of existing railroads, so that service thereon may be increased and improved to the fullest extent possible.
2. The receipt, as soon as practicable, by the city of sufficient returns from the operation of the railroads that the corporate stock or bonds issued by the city for the construction of rapid transit railroads may be exempted in computing the debt-incurring power of the city under the Constitution of the State.
3. The assuring to the people of the city the continuous operation of the railroads at the present or lowest possible fares consistent with the just valuations of the railroads and their safe and economical operation.

The court said that the method by which these purposes are to be accomplished is specifically pointed out in Section 107. Furthermore it pointed out that:

> The commission is not authorized to make any new contract or modify any contract for the construction, equipment, maintenance of operation of the railroads. or any of them, without the approval or consent of the local authority, where such new contract or modification of an existing contract requires to carry it out the authorization by the local authority of corporate stock or bonds of the city in addition to the corporate stock or bonds required to carry out such existing contract.

The contentions of the city as restated by the court were:

1. That the act violates Article X, Section 2, of the Constitution.
2. That the act is unconstitutional in that it violates Article 12, Section 2, the claim in this respect being that the act is a special city law, since it does not apply to all cities of the first class, and could not, therefore, become a valid legislative enactment because it was not transmitted to the Mayor of the city of New York before it was passed.
3. That the act violates Article 3, Section 18, of the Constitution, the contention being that the act applies only to cities having a population of more than 1,000,000; that the powers specified in the act are to be exercised and carried out only by the transit commissioners of the First District, which includes only the city of New York; that New York is the only city of the State having a population of more than 1,000,000, and it therefore follows that the act is limited to such city and becomes a local law.

Under these three heads the court held in substance as follows:

1. The assertion is unfounded that the Transit Commissioners are city officials within the meaning of that provision, and has, in effect, been so determined by this court. They are not city officers. The fact that they happen to be at the present time considering rapid transit solely for the city of New York does not necessarily make them officers of that city. The power formerly given to and vested in the Rapid Transit Commissioners was transferred to the Public Service Commissioners, and under the act now under consideration it has been transferred to the Transit Commissioners. The Legislature had a right to make these changes. (People ex rel. Simon vs. Bradley, supra.)
2. If the act be a special law, then the claim is well founded. I am of the opinion, however, that it is not a special city law, and this court, in effect, so decided in Admiral Realty Company vs. City of New York (206 N. Y., 110 140). It is true that in that case the statute under consideration was the Rapid Transit act, which became a law before this provision of the Constitution went into effect, but the decision of this court, as appears from the opinion delivered, was not put solely upon that ground.
3. This reasoning is plausible, but fallacious. The act is general in terms. It applies to all cities in the State having a population of 1,000,000 or more. It may be conceded that at the present time it is applicable only to the city of New York, but, if so, it by no means follows that it was intended only for that city, since there may, and probably will in the near future, be one or more cities to which it will be applicable. Certainly there is no conclusive presumption to the contrary.

Richmond Men Strike

Recent Wage Cut Rejected—Attempts at Arbitration Fail—Railway Resuming Service

Three days of negotiations have failed to settle the strike which has practically suspended service over the lines of the Virginia Railway & Power Company. Reports indicate that the strike, which took place at midnight on Sunday, Jan. 15, was practically unanimous in Richmond and Portsmouth, about 60 per cent effective in Norfolk and that the men in Petersburg refused to go out.

SERVICE BEING RESTORED

The company has refused to hire strike breakers, but has taken on some former employees and is running a few cars in each city. Service in Norfolk on Jan. 18 was reported 60 per cent normal, with less than that in Portsmouth. Normal service is given in Petersburg, but the interurban line between Richmond and Petersburg is giving only an occasional car.

In Richmond cars were in operation on Jan. 18 and the company promises to add to the number from day to day.

Efforts of the City Council and of Mayor George Ainslie to bring about arbitration have failed. The company through President Thomas Wheelwright has declined to enter into arbitration on the wage question unless the same arbitrators are empowered to fix fares and so provide the income to meet the wages. The Council holds that it is powerless to delegate this power and announced that it has no intention of being hurried in its deliberate consideration of a new blanket franchise to take the place of a number of grants under which the company is now operating, and which have from five to twelve years to run.

The strike results from an order of the company posted Jan. 1, and effective on Sunday night, Jan. 15, at midnight, reducing wages from 15 to 20 per cent to the following scale:

> First-year men; 30 cents an hour; second year, 35 cents an hour; and over two years, 40 cents. Five cents an hour is added to this scale for operators of one-man cars and for employees of the interurban division. Shop and station employees are cut a straight 10 per cent. On this scale beginners in platform work on a ten-hour schedule make $3 a day and older men working one-man cars make $4.50 a day.

Richmond experienced a disastrous railway strike in 1903 which paralyzed business for several weeks and caused enormous loss, finally resulting in the complete victory for the company and the breaking up of the union. Following this the men there remained unorganized until during the war.

AUTOS CALLED INTO SERVICE

The radical difference noted by every older citizen in comparing the two strikes is that in this tie-up there has been little interruption of business. Employees are getting to work on time. Three or four hundred jitneys are in regular operation and thousands of private cars are doing their bit to help along. The only inconvenience experienced is among those living in the suburbs where jitney lines have not been organized.

The strikers are running jitneys with placards announcing that payments made to drivers are being donated to the strike fund. Members of thirty-eight other unions affiliated with the American Federation of Labor and twenty-one railroad unions not affiliated are to be assessed to aid in the strike fund.

The company is said to be making a very large profit on its light and power business, but claims to be losing money on the railway divisions. According to its statement it lost $550,000 last year on its operation of cars in Richmond, Norfolk, Portsmouth and Petersburg, but city authorities are preparing to retain expert accountants to examine the company's books to substantiate this claim.

A proposition from Mayor Ainslie to increase the fare from 6 to 7 cents pending the outcome of arbitration, the men to go back to work at once, and the whole question of wages to be submitted to arbitration, the board of arbitrators also to report to the city council what will be a reasonable fare to be charged, was promptly rejected on Jan. 18 by both the company and the strikers.

COMPANY EXPLAINS TO PUBLIC

The company in a published advertisement asserts that its traffic is falling off rapidly due to jitney competition and the wide extension of private automobiles, and that the deficit for this year bids fair to be larger than that of last year. Unless the profits of the light department are sufficient to carry this burden the company will, indeed, be faced by a very difficult situation.

January 19, the fourth day of the strike, showed no change in the general situation. The company then had eighteen cars in operation in Richmond and the striking motormen and conductors were operating several hundred jitneys. Efforts at mediation have failed and the company has posted notices to the effect that men who do not return to their posts by Friday will be considered discharged and that thereafter it will proceed to fill their places. A number of agencies have offered to furnish men to replace the strikers, but so far no men from out of town have been put to work.

So far the strike has been orderly and the union men have behaved in good spirit. The city attorney held on Jan. 19 that former railway men operating jitneys must secure licenses and that they charge no regular fare and all donations are regarded as contributions to the union.

There has been no serious disorder, though the police have made a number of arrests for minor offenses. The cars of the company are carrying very few passengers.

Des Moines Case Argued

Iowa Supreme Court Expected to Rule Next Month on Recent Franchise Election

The entire bench of the Iowa Supreme Court, consisting of seven judges, during the week ended Jan. 14 heard the arguments of the attorneys in the Des Moines City Railway franchise case brought upon appeal from the district court of Judge James C. Hume. In the lower court Judge Hume had granted an injunction to prevent the holding of the franchise election, but upon appeal to the Supreme Court on a writ of supersedeas the election was permitted.

H. W. Byers, former corporation counsel for the city of Des Moines, appeared for Grant Van Horn of the North Des Moines Improvement League, which sought the injunction. Mr. Byers contested the proceeding on the grounds of the illegality of the election through improper publication of the notice calling the election. He also claimed that his client had a vested interest in the old franchise which permitted him to ride for 5 cents, and further that the new franchise contained certain provisions which are unconstitutional. Judge W. E. Miller, corporation counsel, appeared for the city and denied that Mr. Van Horn had any vested interest in the franchise, citing an Arkansas decision that a street railway rider did not have such interest.

DECISION EXPECTED IN FEBRUARY

Judge Miller defended the legality of the publication proceedings conducted in connection with the passage of the franchise. He said that every step in the franchise election negotiations had been carried out in a legal manner. Judge Miller maintained that the grant was not complete until the franchise had been finally accepted by the company and that previous to this action the publication had been complete. He argued that the Supreme Court should not anticipate any alleged unconstitutional provisions in the franchise, but should permit the contract to be completed and allow the constitutionality of the provisions to be determined afterward.

It is thought that the Supreme Court will render its decision in the case during February.

Almost coincident with the hearing in the Supreme Court Judge James C. Hume in the District Court decided that the Des Moines City Council could not deny the Valley Junction-Des Moines buses the right to use the streets of Des Moines. The City Council had ruled the inter-city buses from the streets, but the proprietors of the bus line sought an injunction in Judge Hume's court. Judge Hume based his opinion on the fact that the Valley Junction buses were quartered at Valley Junction, outside of the city limits of Des Moines, and that the City Council had no right to restrict inter-city business.

Following Judge Hume's decision members of the Des Moines Bus Men's Association started overhauling their equipment and claimed that they would attempt within the next few days to place buses in operation on at least four lines. Ever since the City Council ruled the buses from the streets upon resumption of specified service by the Des Moines City Railway the only buses which have been operated in the city have been between Des Moines and Valley Junction, a suburb about 5 miles distant.

The Des Moines City Railway has been overhauling and repainting its rolling stock and announced on Jan. 14 that within the next ten days fifteen more cars will be placed in service, bringing the gross number up to 131 cars. Service has been improved constantly during the last month and there appears to be a general spirit of satisfaction among car riders over the facilities afforded.

Hudson Valley Puts Into Effect Third Wage Cut

The Hudson Valley Railway, Albany, N. Y., has announced a decrease in the wages of its employees amounting to 5 cents an hour, effective Jan. 1. The wages are now 45 cents an hour. This makes the third cut within four months.

On Sept. 30 the platform men of the Hudson Valley Railway were informed that, effective Oct. 1, the wages of all employees would be decreased 5 cents an hour, the reduced rate to be in effect to Nov. 1, on which date a further decrease of 5 cents an hour would go into effect and these rates were to be guaranteed by the company until Jan. 1, 1922.

The financial condition of the company is reflected in that statement, part of which is reproduced below:

> Since the railroad was built twenty years ago, it has annually operated at a loss. It has been operated by its present owners for fourteen years, during which time it has lost $1,400,000, of which amount $261,408 was incurred during the eight months of this year ended Aug. 31. This great loss, which averages more than $300 a day for the fourteen years, was incurred for the simple economic reason that the company's revenues had not kept pace with its expenses, despite three increases in fare—from 5 cents to 6 cents, from 6 cents to 7 cents and from 7 cents to 8 cents. Very little, if any, relief came from the increased fares, as the delay in granting them was so great that in the interim the company was burdened with additional expenses which the increased fares could not possibly wipe out. The first fare increase was not granted until a year and five months after it had been requested, the second more than eight months after and the third nearly a year after, although the wages were increased in each case at the time of application.

It is interesting to note the steady increases in rates paid under the present owners of the property:

Year	Cents
Aug. 1, 1908	22
July 1, 1909	25
July 1, 1910	26
July 1, 1912	27
July 1, 1914	28
July 1, 1916	*28-29-30
July 1, 1916	†29-30-31
Jan. 1, 1916	*29-30-31
July 1, 1918	40
July 1, 1919	45
July 1, 1920	60

*Glens Falls & Saratoga Division.
†Waterford Division.

In announcing its present cut the company states that it is not taking in enough money to pay operating expenses and taxes and that this further reduction is necessary in order to pay the wages of employees and also the taxes due the various municipalities through which this company operates.

Jitney Cases Before Court

Otis M. Thatcher, Charles J. Duff, William Houghtaling and Dewitt J. Clapper, Albany, and Theodore J. Gackstatter and Christos Dominos, Watervliet, were adjudged guilty of criminal contempt of court and fined $100 each and in default of the payment of the fine to serve thirty days in jail by Justice Charles E. Nichols on Jan. 14 at the special term at Albany, N. Y. The men were charged with violating the injunction order granted by Justice Harold J. Hinman last August prohibiting any person from operating jitneys in competition with the United Traction Company.

Justice Nichols also heard arguments and reserved decision in the application of the Troy & New England Railway for a temporary injunction restraining the K. L. W. M., Inc., from operating a bus line from Troy to Averill Park through the town of Sand Lake. Mr. MacLean and Mr. Carter, representing the company, said that the town board of Sand Lake, comprising the supervisor, town clerk and the four justices of the peace, had adopted a resolution on Dec. 28, under authority of an amendment to the transportation law, passed by the Legislature of 1919 making the provisions of the transportation law applicable to a town whenever a resolution to do so is adopted by the town board. Such a resolution would require the operator of a bus line to obtain from the Public Service Commission a certificate of convenience and necessity.

Clark Cipperly, appearing for the bus line, which has been in operation since the strike began a year ago on the lines of the United Traction Company, and was recently incorporated with a capital of $6,000, declared the action of the town board on which the application for an injunction was based to be illegal because the superintendent of highways of the town of Sand Lake had met with the town board when the resolution was adopted and illegally voted on it. He produced the minutes of the board showing that four votes were cast in favor of the resolution and three against, which were cast by ballot, and there was nothing to show that a majority of the legal members of the board were recorded as being in favor of it.

He also contended the company had no standing in court as it had failed to follow the requirements of the law in obtaining consents of property owners through which the line runs for its operation and that it has never had such consent.

Ouster Delayed

Mayor Couzens of Detroit to Await Action at Annual Meeting of Detroit United in February

Developments at the conference on Jan. 12 of officers of the Detroit United Railway and officials of the city of Detroit came as a surprise to Detroiters, and as a result of the personal appeal made by A. Avila Gingras as representative of Montreal stockholders of the railway, the enforcement of the ouster ordinance on Fort Street and Woodward Avenue will be held up until after the annual meeting of stockholders on Feb. 7.

MAYOR REJECTS COMPANY'S OFFER

Although the Mayor rejected the price mentioned by the company representatives at which it would sell its entire system to the city, the break between the city and the company was averted by the appearance of the Montreal representative, who stated that the stockholders in whose interest he came were not informed of the situation in which the company was placed. The Mayor's action in deferring enforcement of the ouster ordinance until after the stockholders' meeting on Feb. 7 resulted in car service being continued on Fort Street and Woodward Avenue.

Mr. Gingras stated that he controlled enough votes to change the directorate of the company. He further explained that while the interests he represented were heavy stockholders, they had kept hands off because they were not residents of Detroit. However, it was now considered necessary by them to take part in the company's affairs at this time because the property was apparently endangered.

While Mr. Gingras declined to state who the candidate for president would be, he indicated that Charles Lauendeau of the present board would probably represent the Montreal interests. Mr. Lauendeau, he stated, was active a few years ago in straightening out the difficulties of the Montreal Tramways, now operating under service-at-cost.

CITY WILLING TO PAY ONLY $20,000,000

Although Mayor Couzens expressed willingness to let the Montreal broker sit in at the conference on Jan. 12, Allan F. Edwards, vice-president of the company, informed him that inasmuch as he is not a member of the directors' committee, nor on the board, it would not be proper for him to take part in the conference. After the conference members of the Street Railway Commission stated that only the unexpected developments just related had resulted in the postponing of the enforcement of the ouster ordinance, since the company's offer was considered too high. The conference was made up of the same representatives for the city and company as were present at the preceding conference.

The company's price at which it offered to sell its entire city system was announced on Jan. 12 as $24,500,000. This price was set on all remaining lines and does not include the day-to-day agreement lines recently taken over by the city at approximately $2,300,000. This additional item would make the price to the city about $26,800,000 for the lines that it offered in 1919 for $31,500,000. While Mayor Couzens was willing to pay the amount named in 1919, he is not in favor of paying more than $20,000,000 at the present time for the remaining lines. The city officials have not completed their estimate and the exact price they would be willing to pay has not been agreed upon. The Mayor stated that there was some uncertainty as to the city wanting to take over all the lines in view of changes that transportation is undergoing at the present time. He believes that considerable rerouting is necessary to improve the system.

Joint operation was started on Fort Street on Monday morning when the city started running cars alternatively with the Detroit United Railway. The Fort Street line is the fourth one to go under joint operation. The municipal railway officials plan to use Woodward Avenue type cars and Peter Witt cars on Fort Street, and Detroit United Railway employees formerly operating company cars have been taken into the employ of the municipal system. Some further details remain to be worked out and there is a possibility of the one-man safety type cars being operated by both the company and the city on one section of the line.

P. R. T. Offers to Bear "L" Operating Costs for First Year

President Mitten of the Philadelphia (Pa.) Rapid Transit Company, in a statement issued on Dec. 31, 1921, amended the recent offer made to City Councils and offered to bear the loss in operating the Frankford Elevated line for the first year, to pay to the city for the second year 1 per cent on the cost of the line, for the third year 2 per cent, for the fourth year 3 per cent, for the fifth year 4 per cent, and for the sixth year and after 5 per cent, should the agreement continue for that length of time. The Market Street line did not earn a 5 per cent return until the seventh year that it had been in operation.

The amendment also provides that the city deliver 100 cars to the Frankford elevated line and the Bustleton surface line, fully equipped and ready for operation.

The original proposal, to which these amendments are added, offers, as reported in the ELECTRIC RAILWAY JOURNAL for Dec. 24, 1921, free transfers between the Frankford elevated and all connecting cross-town surface lines north of Arch Street. Free transfers will be continued between the Market Street elevated and connecting surface lines. The fare on the line between Bridge Street, Frankford, and Sixty-ninth, West Philadelphia, will be 7 cents cash or four tickets for 25 cents. Free transfers will be given between Bustleton line and the Frankford elevated, but an additional 7-cent cash fare or four tickets for 25 cents will be charged between Cottman Street and the present terminus at Bustleton.

The amendments are based upon the continuation of the present fare, but the unamended proposals, providing for a payment to the city of 5 per cent, were built on the basis of a straight 7-cent cash fare.

The Public Service Commission has approved the clause in the proposal providing that the same rate of fare shall be charged on the Frankford line as on the other transit lines, and the clause which states that the city may terminate the lease, after the first five years, upon six months' notice.

This action by the commission removes all uncertainty as to the acceptability of the lease with those provisions. Only the rental question remains to be settled between the city and transit company officials.

In a review of the transit tangle directed to city officials and the public generally, Mr. Mitten as evidence of the good faith of the company cites that the surplus for 1921, which amounts to $1,800,000, or 6 per cent on the paid-in capital, has been used for improvements and not for the payment of dividends.

News Notes

Company Exempt from Repaving Charges.—The Community Traction Company, Toledo, Ohio, has been held exempt from all charges for repaving of streets along which the tracks are laid. Formerly the company was compelled to pave nearly half the width of the streets.

Courtesy Resolution Approved.—Numerous telephone calls and letters are coming into the office of President James P. Barnes of the Louisville (Ky.) Railway and officers are receiving congratulations from many acquaintances, in connection with the Courtesy Resolution of the company, expressed on Jan. 1, as a New Year's resolution of the company, to be followed by all employees in their relation to one another and the public.

New Wage Scale in Effect.—A 20 per cent reduction in wages was the award of the arbitration committee which was appointed several weeks ago to settle a wage dispute between the Cincinnati Traction Company and the International Brotherhood of Electrical Workers. Under the new contract line foremen are reduced from 97½ to 78 cents an hour; assistant line foremen from 92 to 74 cents an hour and linemen from 87 to 70 cents an hour. The new scale of wages retroactive to Jan. 1.

Financial and Corporate

Municipal Railway Has a Better Year Than Last

Financial Operations of San Francisco Line Show a 20 per Cent Gain Over Previous Year

The finance committee of the Board of Supervisors of the city of San Francisco, Cal., has just issued a financial report of operations of the Municipal Railway. This report covers operations for the year ended June 30, 1921, and also gives in detail a comparative table of operations by years since the railway started operation.

The balance sheet now sets the value of plant at $7,016,984. In addition there are current assets that total $2,197,014 and deferred accounts receivable for advances incident to the building of the Stockton Street Tunnel of $48,971. These together give the total assets of the railway as $9,262,969, a gain of $340,133 over the previous year.

The liabilities, reserves and surplus set up against these assets show that $2,469,764 has been put into the property from income. The details of the liabilities follow:

Funded debt	$4,586,200
Current liabilities (accounts payable and interest on funded debt)	294,258
Depreciation reserve	1,510,617
Compensation reserve	69,577
Contributed surplus (from general taxes and premium on bonds)	332,553
From income:	
Bonds retired	894,000
Reserve for bond redemptions	100,200
Advance account of Twin Peaks Tunnel	82,153
Advance account of Stockton Street Tunnel	48,971
Charter reserves	18,033
Additions and betterments	1,303,845
Operating surplus per year	21,762
Total surplus from income	$2,469,764
Total liabilities, reserves and surplus	$9,262,969

Operations for the year indicate that traffic has had a normal increase and which, due to no change in fares, has been reflected accordingly in the passenger revenue. Of the expenses of operation power and maintenance of equipment are the only items that show much if any increase during the year.

The accompanying income statement has been built up to correspond with the I. C. C. classification of accounts. This therefore includes comparison charges, such as taxes, etc. A study will show that the net income for the year was 20 per cent more than a year ago, and if the comparison charges are eliminated there will be a profit from operation of $56,369, as against $4,933 the previous year.

The report also has a table showing the cumulative income as of June 30, 1921, or since operation was started on Dec. 28, 1912. During this period the road earned $16,434,695. The cost of operation was $10,724,718. Interest on funded debt amounted to $1,757,928 and the reserve set up for depreciation and accidents amount to $2,944,507. All told the excess of income over operating expenses, interest, depreciation and accident reserves amounted to $1,173,924. If comparison charges are deducted to bring the figures in accord with private operation the loss for the eight years operation would be $266,244.

Threat Made to Withdraw Service in Lorain

Electric railway service will be withdrawn from the streets of Lorain, Ohio, within the next few weeks unless the City Council regulates jitney buses, according to F. W. Coen, general manager of the Lorain Street Railway. In a statement to the Council Mr. Coen said:

> We're tired of spending thousands of dollars repairing streets for the jitneys. Place the buses under the same expense burdens as the Lorain Street Railway or we'll withdraw our service.

According to Mr. Coen, the company has spent nearly $500,000 in repairs and taxes. Passage by the City Council of an ordinance regulating the buses is the only move which will serve to maintain railway service.

Withdrawal of service by the Lorain Street Railway will throw seventy-five men out of employment and force twenty-seven cars to remain idle. The Lorain Street Railway is controlled by the Lake Shore Electric Railway.

While the Cleveland, Columbus & Southwestern Railroad provides Lorain with service to Lorain and Amherst, withdrawal of service by the Lorain Street Railway would place the burden of transportation almost entirely upon buses.

Laxity by the city solons in solving the problem is believed to have been responsible for Mr. Coen's ultimatum.

Good Record Shown for Month of December

The Public Service Railway, Newark, N. J., carried 10 per cent more passengers in December than in November, according to its report filed in the federal court at Trenton. The report does not give the number of passengers using school fares, nor the number of non-revenue passengers. The report shows nearly 3,000,000 more passengers were carried last month than in November. The total number of persons paying the 8-cent fare increased by 749,731, while the total number of those using tokens at four for 30 cents increased about 100,000.

STATISTICAL INFORMATION—MUNICIPAL RAILWAY OF SAN FRANCISCO

Year ended June 30	1921	1920	Per Cent Change
Track owned and operated (miles)	57.97	57.97	.....
Track owned and operated jointly with United Railroads (miles)	5.15	5.15	.....
Carhouse tracks and sidings and unused spurs (miles)	4.00	4.00	.....
Total mileage	67.12	67.12	.....
Average total miles of single track operated at end of year	63.12	63.12	......
Revenue car miles	(a)	7,182,475	......
Revenue bus miles	(a)	236,797	......
Total revenue miles	$7,538,737	$7,419,272	1.4
Revenue car hours	(a)	(a)	......
Revenue bus hours	(a)	(a)	......
Total revenue hours	$806,761	$795,578	1.1
Revenue passengers carried on cars and buses:			
Five cent cash	56,910,535	53,645,764	6.20
Five cent government ticket	62,034	66,904	*7.28*
Two and one-half cent school ticket	745,902	639,894	11.68
Two cent revenue transfers	371,326	600,296	*38.20*
Total revenue passengers	58,089,797	54,952,858	5.50
Free transfer passengers	11,361,120	10,757,504	5.50
Free passengers, employes, police, firemen, etc.	509,917	458,884	11.12
Total car and bus riders	69,960,834	66,169,246	5.80

Note—Italics indicate decrease.
(a)—Information not given in report.

INCOME STATEMENT—MUNICIPAL RAILWAY OF SAN FRANCISCO

Year ended June 30	1921	1920	Per Cent Change
Revenues:			
From transportation	$2,868,616	$2,702,289	6.2
From other railway operations	10,468	10,147	3.0
Total railway operating revenue	$2,879,084	$2,712,436	6.2
Operating expenses:			
Ways and structures	100,228	102,130	*1.86*
Equipment	201,109	186,947	7.5
Power	401,862	348,383	15.2
Conducting transportation	1,315,475	1,293,309	1.7
Traffic	995	666	49.2
General and miscellaneous	89,122	94,432	*5.62*
Loss on road retired	8,185	.....	....
General and misc. (comparison charges)	4,974	*4,912	1.26
Depreciation (14 percent passenger revenue)	401,669	378,429	6.4
Accident-reserve (4% of passenger revenue)	114,745	108,122	5.9
Total operating expenses	$2,638,364	$2,517,330	4.8
Net operating revenue	240,720	195,106	23.4
Taxes (comparison charges required by charter):			
State franchise (5.25 per cent operating revenue)	151,153	142,488	5.9
Municipal franchise (3 per cent operating revenue)	86,069	81,092	6.2
Municipal car license ($15 per car)	2,985	2,955	1.02
Total taxes	$240,207	$236,535	1.6
Operating income	513	*31,429*	101.6
Non-operating income	35,129	27,405	28.0
Gross income	$35,642	*$4,024*	1,018.0
Deduct for bond interest	224,453	233,773	*3.99*
Net income transferred to profit and loss	*188,811*	*237,797*	20.62
Surplus at beginning of year	*137,686*	100,111	237.00
Surplus at close of year	*326,497*	*137,686*	137.00

Note—Italics indicate loss or decrease.
* Nothing allowed for legal and office expense.

Wants Lien Against Toledo Property

Claimants on judgments and for interest coupons on bonds went into federal court recently and asked leave to file an intervening petition against the Toledo & Western Railroad, Toledo, Ohio, to make their claims a lien against the property. The court took the matter under advisement.

The receivers of the road, J. Frank Johnson and Harry A. Dunn, are also planning to bring into court all persons who made stock subscriptions to the Toledo & Western and seek to collect any unpaid portions. Several of those stockholders live in Cleveland, the court was informed.

Possibility of Solving Financial Problem Seen

Satisfactory adjustment of the differences between the city and the Jacksonville (Fla.) Traction Company, in receivership, over the payment of the company's share of paving Main Street, about $100,000, is believed to be near, according to City Attorney Pat H. Odom. He refused to give any indication as to the solution found, following the electric company's recent demand, voiced by Peter O. Knight, general counsel for Stone & Webster (who own the local company) in the southeast, that a higher fare be granted.

The Railroad Commission granted a 7-cent fare two years ago, but Mr. Knight told the City Council recently that this was not sufficient. He asked that a committee of the Council be named to confer with him on the possibility of relieving the situation.

Whether this committee is prepared to recommend an 8-cent fare so the company can pay the $100,000, or whether some other arrangement has been made such as the issuance of receivers' certificates upon order of the federal judge, is causing speculation.

Meanwhile the paving project on Main Street—or rather two of them, Orange to Phelps and Phelps to Eighth—is being held up.

Twenty-Three Electric Railways Valued at $16,742,658

A total of $7,668,525 is due in taxes for 1921 from public service corporations in West Virginia, according to figures compiled in the office of State Auditor Bond. In addition to the taxes these corporations are required to pay a total of $80,000 for the support of the Public Service Commission. The total assessed valuation of all property in West Virginia owned by these corporations was $368,183,269. The recapitulation shows twenty-three electric railways valued at $16,742,658 on which the tax is $396,157 and the fee $3,863.

The figures for the larger companies are as follows: Charleston Interurban Railroad, tax, $44,679, fee, $347; Wheeling Traction Company, tax, $33,795, fee, $363; Ohio Valley Electric Railway, Huntington, tax, $29,144, fee, $220; Monongahela Valley Traction Company, tax, $163,390, fee, $1,540; Kanawha Traction & Electric Company, tax, $19,080, fee, $220.

3,578,855 Fewer Fares in 1921

Salt Lake Company Must Cut Service or Increase Fares—Bond Interest Not Earned

During the past year the business of the Utah Light & Traction Company, Salt Lake City, Utah, has fallen off as a result of the industrial depression and unemployment. The net decrease in the number of revenue passengers carried in 1921 as compared with 1920 was 3,578,855 fares. At an average rate of 6½ cents per paid passenger, the loss in gross earnings was $232,625 for the year.

As a result of this the company did not earn all of its bond interest, nor could it set up any part of the annual depreciation reserve fund prescribed by the Public Utilities Commission, which requires the company to set up each year a certain reserve to cover depreciation, plus 5 per cent interest on the amount already accrued in the fund. If for any reason the company is unable to pay this in a particular year, it must be made up the next year and the regular amount for that year, plus the 5 per cent interest, must be paid also.

The amount for 1921, which the company could not meet, is $144,725 plus the 5 per cent interest on previous accruals, or $151,961. This sum must be made up in 1922 and in addition future accruals must be earned.

In consequence of this showing the company has been casting about for means of retrenchment. The basic wage scales of the employees were fixed on May 1, 1921, for a period of one year by a board of arbitration, and therefore cannot be disturbed at present. It was finally decided that about the only reduction in expenses that can be effected at this time is to reduce car service. To this end a careful check of the traffic on each line has been made, and it was found that riding on many lines has fallen off to a point where a reduction in car service should be made. Car service on the Depot Loop was reduced on Dec. 18. Next it was found that a saving of about $12,000 a year could be made by changing the downtown loop of the Sixth and Ninth Avenue lines. This change and proposed economy has been opposed, and the question is now before the Public Utilities Commission.

Regardless of the outcome of this case the company is convinced that substantial reductions must be effected if it is to continue to operate on the present rates of fare. The officials of the company believe that they have correctly sensed the wish of the great majority of the people of the city in endeavoring to reduce expenses rather than increase rates. In this connection they say:

> It must be one or the other, and we ask you to bear this in mind if the company proposes to reduce service on your line. Such reduction will not be below that of the average for the system as a whole.

Financial News Notes

Interborough Postpones Meeting.—Interborough Rapid Transit Company postponed its annual meeting from Jan. 16 to Feb. 15.

December Net Income Is $126,590.—December reports of the Market Street Railway, San Francisco, Cal., show operating revenues to be $815,276, operating expenses and taxes $628,332, operating income $186,944, non-operating income $3,717, gross income $190,661 and net income $126,590.

Temporary Suspension Authorized.—The California Railroad Commission has authorized the San Francisco-Oakland Terminal Railways to suspend operation on part of its system at El Cerrito, Contra Costa County. The limit of time is ten years. The company has not been operating the line for five years under a previous order of suspension.

Directors Elected.—The annual election of officers for the New Orleans Railway & Light Company, New Orleans, La., will be held on Feb. 6, 1922. At the recent annual meeting of the board of directors of the company, A. L. Kempster, general manager, was elected to the board of directors, to succeed J. S. Bleecker, now engaged in other business. D. D. Curran, J. W. O'Keefe, Frank B. Hayne, Lynn H. Dinkins, J. H. DeGrange and R. W. Wilmot were re-elected to the board.

Losses Shown Under Five-Cent Fare.—According to a report submitted to the Public Utilities Commission of Connecticut by President L. S. Storrs of the Connecticut Company, the operating results of the Bridgeport division of the Connecticut Company for the week ended Jan. 7 as compared with the same days of last week of the flat 10-cent fare, shows a loss of $2,595. A similar comparison for the Norwalk division shows a loss of $100 under the 5-cent fare. The loss for the week ended Dec. 31, for the Bridgeport division was $3,140 and for the Norwalk division, $355.

Wants Receiver Appointed.—A court order has been issued against the Fairburn & Atlanta Railway & Electric Company, operating in Atlanta suburbs, directing the company to show cause why a receiver should not be appointed for the line. An injunction is also asked against the company, the petition being filed by J. L. Brassell, trustee for the holders of bonds against the company in the sum of $42,000, which matured Jan. 1, 1922, and which the company was unable to pay. The injunction is asked on the grounds that the defective condition of the roadbed makes it dangerous to operate the cars.

Traffic and Transportation

Buses Barred from Downtown Districts

Toledo Regulates Buses While Street Railway Commissioner Plans Increased Service

An order barring all buses from operation in the downtown district at Toledo, Ohio, went into effect at midnight on Saturday, Jan. 14. This was the first real regulation under the ordinance passed by Council some months ago and which gives to the director of safety the duty of assigning routes and schedules to buses. Before that time all bus operators must file with the finance director their new routes and pay their 1922 license fees.

After several conferences, at which Mayor Bernard F. Brough, Finance Director Walter Stewart, Law Director Frank Dotson, Street Railway Commissioner Wilfred E. Cann and Safety Director Gilson D. Light of the new administration were present, this plan of regulating the buses and preventing downtown congestion was worked out.

The district from which buses will be barred is bounded by Cherry Street on the north, Erie Street on the west, Washington Street on the south and the Maumee River on the east. The territory is six squares wide by eight squares long and contains most of the downtown business houses.

INTERURBAN BUSES ALLOWED IN LOOP

Interurban buses will be allowed to loop into the district to call at their new interurban bus station which is near the electric interurban station.

The city officials believe that this new order will enable them to check up on the operations of the buses more accurately and prevent the ruthless competition which has marked the operations here for several months.

Although theoretically regulated, the buses invariably operated so as to beat electric railway cars by a block or less and pick up passengers at crowded downtown corners in peak load periods of the day, and a large percentage of them went off the streets during the hours when few passengers were carried.

However, it is estimated by the city officials that the 93 buses operating last week were carrying an average of 20,000 passengers daily. This diverts much revenue away from the electric railway company. It is the plan of the street railway commissioner to purchase a few extra cars, placing probably about $10,000 a month toward this account, and affording the car riders improved service on most all lines. Schedules will be revised immediately after the new regulation goes into effect.

The excess of revenue above the cost of the cars will go into the fare stabilizing fund and on the present basis will work toward a fare reduction in the course of a few months.

Mayor Brough stands firmly for the regulation of buses because he explains that ten citizens ride electric railway cars to every one using bus service. He believes that the regulation of competition will favor the car riders.

Some of the buses may be forced by the new order into auxiliary service. This would be favored by the street railway commissioner and would probably form a good indication of future routes for extensions.

Police have been instructed to enforce the bus regulation order as violations of a city ordinance which makes the maximum penalty $500 fine.

The Toledo Bus Owners' Association officials asked the Mayor to modify the order to permit them one trip through the business district on each round trip of their route, but the Mayor did not yield. They have threatened to test the order in the courts through injunction proceedings. The city legal department will fight the battle for the city. The ordinance has already been held to be constitutional by the Supreme Court of Ohio.

Committee Appointed to Survey Freight Transportation

The Connecticut Chamber of Commerce, at a meeting held in New Haven, Conn., recently, appointed a committee to make a survey of the freight transportation situation in Connecticut and to suggest proper adjustment between the railroads and motor trucking transportations companies. The personnel of the committee named is as follows: Le Grand Cannon, of the Austin, Nichols Company, New Haven, representing the merchants; John T. Chidsey, president of the C. J. Root Company, Bristol; and Paul K. Rogers, secretary-treasurer of the Skinner Chuck Company, of New Britain, representing the manufacturers; Arthur M. Collens, manager of the investment bureau of the Phoenix Mutual Life Insurance Company, Hartford, representing financial interests; E. J. Pierson, president of the New York, New Haven and Hartford Railroad, representing the railroads; Lucius S. Storrs, president of the Connecticut Company, representing the "Ship-by-Trolley" movement; H. H. Skerritt, Jr., manager of the Hartford branch of the Packard Motor Sales Company, representing the automotive interests; Samuel Russel, Jr., Middletown, representing agriculture; Robert Scoville, Lakeville, formerly Connecticut Food Administrator during the war; and Alfred H. Terry, former city engineer of Bridgeport.

Railway Ordinance Passed

City Council of Cincinnati Adopts Plan Insuring Continuation of Seven-and-a-Half-Cent Fare

By a vote of twenty-seven to three the new electric railway ordinance has been adopted by the City Council of Cincinnati, Ohio. It insures a continuance of the present 7½-cent fare, through deferring payment of the franchise tax of $350,000 for one year from the Cincinnati (Ohio) Traction Company.

The ordinance is not to become effective for thirty days. The traction company has thirty days after the date of its passage to reject or accept its terms. The ordinance in substance is the same as the ordinance passed by Council six months ago, except that the six-month period during which the franchise tax was not to be considered to be a factor in rate making is extended to one year.

Furthermore Saul Zielonka, City Solicitor, said that the new ordinance provided that if the company for any reason increased the fare beyond the present limit of 7½ cents, then the so-called deferment clause would cease to be operative from the time that such increase is made until the fare again is reduced to 7½ cents, and during the period the increased fare is demanded the franchise tax for that period would be considered to be a rate-making factor and to be payable to the city.

A resolution also was adopted authorizing Mayor George P. Carrol to appoint a citizens' committee which is to confer with city officials and officials of the traction company relative to a readjustment of the traction properties.

Councilman Edwin Kellogg bitterly opposed the passage of the ordinance and fought for the indefinite postponement of the proposal. He recently introduced a resolution seeking the forfeiture of the franchise of the Cincinnati Traction Company on the grounds that the company had not fulfilled its obligations to the city in that it is back in the payment of the franchise tax.

Davenport Fare Increase Hearing Set

Hearing in the case of the Tri-City Railway of Iowa, Davenport, has been set for Jan. 24. At that time the motion will be heard of the City Commission that the injunction, permitting the transit company to charge an 8-cent fare, be set aside. The injunction was asked for by a number of merchants of Davenport, and prevents the city from interfering in the fare increase. The merchants claimed the former 5-cent fare would impair transportation.

The plan of a 5-cent fare for purchasers of a 50-cent ticket book once a month will soon be presented to the City Council. This plan will go into effect on the Illinois side of the river on March 1, under a ruling of the Illinois Commerce Commission.

Fares Cut in Connecticut

Three Tokens to Be Sold for a Quarter —Cash Fare Remains at Ten Cents —Cities Still Restive

A reduction of 16 per cent in fares will be made effective on March 1 on all lines of the Connecticut Company through the sale of three tokens for 25 cents. A token or 10 cents will be accepted in paying for one fare within any of the present flat fare areas, with all transfer privileges as at present. These tokens will be sold by all conductors at three for a quarter, or may be purchased at the company offices and agencies at twelve for $1.

This method of reduction recognizes the difference between the casual rider, who will pay 10 cents, and the regular patron who will, of course, use the reduced rate token. It also continues the single fare for one trip within an entire city area.

Due to the present industrial depression the revenues of the company are less than last year at this time, but by reason of an 8 per cent reduction in rates of wage and decreases in the cost of coal and other materials, the expenses are slightly less than last year, although still more than twice as much as in pre-war years.

INCREASE IN PATRONAGE ESSENTIAL

The hope is expressed by the company that reductions from the present rate of fare will induce an increased use of the cars and thus offset, to a certain extent, the reduction in revenue accompanying a lower rate of fare.

The decision to reduce fares was reached at a meeting of the directors of the company held on January 7. This had been anticipated in a statement made in November, that if conditions during the winter were favorable, such action would be taken.

It was in November, 1917, that the Connecticut Company made the first increase in the fare, from 5 to 6 cents, and at 6 cents it remained until October, 1919, when a zone system was installed with 6 cents as base fares and short zones at 2 cents. This system was followed by a further modification of the zone plan and was in turn followed by the so-called 7-cent 6-cent plan, which in November, 1920, was replaced with the 10-cent straight fare.

Last summer a movement for lower fares brought about the establishment by the Public Utilities Commission, for a probationary period of ninety days, of a 5-cent fare on city lines in Norwalk and Bridgeport. In Norwalk the rate went into effect Nov. 9 and in Bridgeport Nov. 20. The period will expire on Feb. 9 and 20, respectively. Soon after the experiment began, Waterbury, New Haven and Hartford indicated to the commission that they would like 5-cent fares within their urban limits. The commission intimated that it would await the termination of the probationary periods before making any decision.

The fare reduction announced will apply to Bridgeport, Conn., where a 5-cent fare has been in vogue for a trial test of ninety days. In response to an inquiry Mr. Storrs said:

> The fare reduction of the Connecticut Company is planned to cover the entire State, including Bridgeport. Until Feb. 20 the Bridgeport trolley fares matter is in the hands of the Connecticut Public Utilities Commission under a ninety-day 5 cent fare test. What they will do after that date, I do not know.

Despite the fact that the Connecticut Company has announced a voluntary fare reduction in all lines controlled, municipal authorities at Hartford, Conn., are seeking a further fare reduction. The Common Council of the city will hear a report from a special committee on Jan. 23. This will ask that a petition be filed with the public Utilities Commission asking for still lower rates than those already announced.

Railway Planning to Oppose Bus Application

It is considered probable that the Poughkeepsie City & Wappingers Falls Railway Poughkeepsie, N. Y., will fight the application of the B. & B. Bus Company for a franchise permitting it to pick up and discharge passengers in the village of Wappingers Falls, except where the line parallels that of the trolley company, when it comes before the Public Service Commission for ratification.

The board of village trustees of Wappingers Falls has voted unanimously in favor of granting the franchise to the bus company.

Charles A. Brooks, in charge of the Poughkeepsie office of the Poughkeepsie & Wappingers Falls Railway, states that he does not know just what action his company will make until official notification of the action of the Wappingers board is received at the office.

The action of the village board was taken when the application for a franchise was presented by Messrs. Bunnell & Blakeley, proprietors of the bus line, running from Poughkeepsie to Beacon. The bus company was represented by Attorney Herman N. Harcourt.

It is the contention of the electric railway that the bus line, if given the desired franchise, could stop at the east side of the bridge and pick up and discharge passengers and packages.

In its application the bus company agreed not to pick up or discharge passengers on the west side of the village, where its line runs parallel to that of the trolley company.

The electric railway contends that it serves the whole village of Wappingers Falls, and not merely residents on the west side of the bridge.

Carries 27,400 to Rose Tournament

The Pacific Electric Railway, Los Angeles, Cal., carried 27,400 persons to the Tournament of Roses at Pasadena on Jan. 2. The total last year was 43,000. Rainy forecasts cut down this year's crowd, the company stated.

Rule of Road Changed

Cars in Vancouver Now Run on Right-Hand Side — Change Costs Railway $1,000,000

That part of British Columbia containing the cities of Vancouver, Victoria and New Westminster at 6 a.m. on Jan. 1, successfully changed its rule of the road from "Keep to the Left" to the rule prevailing over the rest of the North American continent. The problem was mainly one for the British Columbia Electric Railway to solve. That company operates the city systems in all three cities as well as interurban lines in their vicinity.

LEGISLATURE ORDERED CHANGE

The change was ordered by the Legislature of British Columbia two years ago. It is expected that it will take about two years more to complete all the work in connection with the change. The total cost to the British Columbia Electric Railway will be about $1,000,000, of which the government will pay $350,000.

Work in connection with the change consisted mainly of remodeling the cars, changing switches and cross-overs and of overhead work. Work on the cars has been going on for six months. This consisted of fitting steps to the right-hand side and temporarily boarding these up. By standardizing, as many as nine cars were turned out in one day.

Temporary barricades on the right side were made so that they could be taken off and the whole car turned out for service in less than half an hour. With more than 200 cars to attend to, the mechanical department under G. A. Dickie, at Vancouver had every car ready for right hand service between 8 o'clock Saturday night Dec. 31 and 7 o'clock Sunday morning, Jan. 1. The material taken from the right hand side will be fitted immediately to the open left side, work that will take two or three days.

Of the fifty-six cross-overs throughout the system, some had already been changed; those which had not been changed were blocked up with rubber. Of seventeen electric switches in the mainland system twelve were made ready for service by the time the first cars ran on Jan. 1, duplicate equipment having been installed previous to the change.

CITY COVERED BY SECTIONS

In order to cover the track changes, Vancouver was divided into four districts, to each of which a crew supplied with an automobile was assigned. Victoria and New Westminster were similarly organized. Extra tower wagons were built on motor trucks and the trolley wires and frogs changed. Practically the only trouble experienced on the morning of the change was that of trolleys coming off. On one-round trip of fifteen miles, ten instances were noted. This was remedied later by observing the actual conditions.

On the double-track interurban line between Vancouver and New Westminster, twenty-four stations had to be changed in order to be on the near side of crossings. Practically all these were changed before Jan. 1.

Much of the work on the tracks had to be proceeded with while cars were operating, the last car reaching the carhouse at 4 o'clock on the morning of Jan. 1 while the first right-hand car left the carhouse at 5.30 o'clock the same morning.

EXTENSIVE PUBLICITY CAMPAIGN

The change threatened to be complicated by a strike of the railway employees. In November a board of conciliation whose chairman was accepted by the men heard the case for a reduction of wages sought by the company and recommended a 10 per cent reduction on Dec. 1. The men rejected the award and although the company paid the old scale of 65 cents an hour on Dec. 15 notified the men that the new scale would go into effect on Jan. 1. The men's officials recommended that they do not come to work on Jan. 1, but at a mass meeting held at midnight on Dec. 31 wiser councils prevailed and a vote will be taken later. In view of the timidity of drivers and the requests of the police to automobile owners to leave their cars at home for the first few days, it was felt that a flood of automobiles resulting from a street car strike would cause serious accidents.

The change in the rule of the road was preceded by an extensive safety and educational campaign by the company, both to avoid accidents and to prevent the slowing up of the service.

Transit Company Gives Bond

Pending hearing of an appeal to the State Supreme Court, the Sound Transit Company, Seattle, Wash., recently posted $700 bond in the Superior Court of Thurston County, in the case brought by the jitney company to revive its so-called "Roosevelt Heights" jitney line, which has been banned by the city. Judge John M. Wilson of Thurston County Court recently set aside the certificate of necessity under which the company claimed the right to operate buses into the business district in competition with the Municipal Street Railway. He then refused to sign an order directing the State Department of Public Works to issue a new certificate. The company served notice of appeal and was required to give bond.

Temporary Operation of Buses Encouraged

For the aid of the privately-owned feeder jitney buses now serving the Cowen Park and Fairview districts, Seattle, Wash., and connecting with the municipal electric railway at the Eastlake Bridge, an ordinance has been passed by the City Council allowing the drivers 7½ cents out of every 10-cent fare collected. The other 2½ cents will go to the Municipal Street Railway.

The action was taken to encourage private transfer buses to continue operations until some other settlement of the Cowen Park transportation problem can be reached. Previously the jitneys have been operating on a 50-50 basis with the railway.

In the meantime, the proposal to purchase auto buses for operation in the district by the electric railway, has been temporarily held up, pending decision as to the legality of the plan by a test case in the courts. Corporation Counsel Walter F. Meier has held that the city cannot legally operate automobile transportation lines. The proposal provides for an appropriation of $35,000 for the purchase of municipal auto buses, similar to those now operated in four other districts of the city under the railway management.

Proposed Line Is Interurban Outlet

As an outlet for its proposed interurban service between Tulsa and Claremore, Okla., the Oklahoma Union Railway Tulsa, Okla., will construct a line in Tulsa east of St. Louis Avenue on Eleventh Street. The company is tearing out its Orcutt Lake line on St. Louis Avenue and has obtained an injunction from Judge Biddison restraining the police department from interfering with the abandonment activities. City Attorney Frank E. Duncan favors a hearing on the injunction and, if the Mayor and commissioners approve, intends to ask for a modification or withdrawal of the order. If this fails and if the supreme court does not issue the writ prohibiting the tearing up of the tracks, the city may still appeal from the order of the corporation commission. The city attorney says that the commission is without jurisdiction over electric railway companies. Mr. Duncan made the following statement:

> That section of the constitution defining the duties and powers of the Corporation Commission clearly states that the commission does not have jurisdiction over transportation systems that operate wholly within the corporate limits of a city. If the city goes before Judge Biddison or before the Supreme Court in its efforts to prevent the abandonment of the Orcutt Lake line, it expects to base its contentions partly on this fact. If the corporation commission has the powers it exercises, the franchise of a public service corporation with the city of Tulsa is merely a worthless scrap of paper, and the commission would have the privilege of ordering torn up any street car line in the city.

An appeal from the commission would involve long legal procedure.

I. F. Crow, general manager of the traction company, said that the line on St. Louis Avenue does not meet the requirements for an extension to Claremore and other points, but that Eleventh Street does. He discussed the removal of the St. Louis Avenue car tracks as follows:

> It is to be regretted that a car line once constructed has to be torn out. Such a condition as that pertaining to the tracks on St. Louis avenue would never have existed except for the reason that the O. U. R. lines to the southeast and northwest parts of the city were originally built as possible outlets for interurbans. Both these lines are now paralleled by the other street railway company which has resulted in destructive competition.

$25,000,000 Bus Policy Favored

Measures providing for the establishment of a $25,000,000 bus system for New York City and the abandonment of all surface and elevated lines in favor of subways will be drawn up following a public hearing to be held by the Board of Estimate on Jan. 27. The bill empowering the city with the right to change from the present transit system to one composed exclusively of buses and subways will be presented to the present session of the Legislature at Albany. Previous attempts of the Hylan administration to get such a bill adopted have failed.

At the meeting of the Board of Estimate on Jan. 13, a resolution was adopted favoring the Hylan transit plan as a fixed policy. Commissioner Whalen, of the Department of Plant and Structures, presented an application to the Board for $25,000,000 in corporate stock for the initial expenses connected with the purchase of 3,500 buses which would be operated and maintained by the city. Total fixed charges were estimated at $13,000,000 a year. Commissioner Whalen stated that with a 5-cent fare the total daily return to the city would be $112,000. This is on the assumption that each bus will carry 700 passengers daily. The net income for the year he placed at $4,031,000. Properly to care for the transportation by bus there will be 200 routes required.

At the meeting of the board were representatives from a number of civic organizations, and all agreed that no more elevated lines were wanted.

The substitution plan adopted by the board calls for the replacement, seat for seat, of the surface lines in Manhattan, but in the other boroughs some surface lines would be kept. Trackless trolleys and some buses would be used in Richmond. The cost of installing the buses has been budgeted as follows:

Cost of 3,500 buses, at $5,500 each	$19,250,000
Garage equipment and repair work	700,000
A central garage station	1,000,000
Garage stations throughout the city	3,800,000
Contingencies	250,000
Total	$25,000,000

Testimony which has been brought out in the hearing before the Transit Commission, stated that $75,000,000 would be needed to handle by buses the transportation of New York City now cared for by trolley lines. The Hylan plan would replace 1,060 electric railway cars with 1,300 buses in Manhattan. The Transit Commission within the next week will ask Commissoner Whalen to testify concerning his recently proposed plan. The commission office said, in announcing that it would ask Mr. Whalen to testify, that to establish bus lines certificates of convenience were necessary which would have to be obtained from the Commission. In addition legislative approval for the financial end is required, and the court would have to reverse its attitude. The court now opposes operation of bus lines in competition with established trolley lines.

Higher Fare Saves Road

To save the Millville (N. J.) Traction Company from ceasing operation the Board of Public Utility Commissioners has made an order permitting the corporation to increase its fare from 7 to 10 cents. The company operates in Millville and also a service of 7 miles to Vineland. The company served notice on the commission that unless it was granted the increase in fare it would cease operating and scrap its roadway.

Prominent residents of Vineland and Millville and residents along the line of the company appealed to the directors of the railway to postpone their action until the commission held a meeting to go over the matter. As the result of the order made by the commission the traction directors reconsidered their action to abandon operations. They claimed that the new rate of fare would barely furnish sufficient revenue for operation and would preclude dividends to stockholders.

It's Chestnut Again in Lousiville

The Chestnut Street carhouse of the Louisville (Ky.) Railway in December won the record for the low accident ratio, this being the third time that this carhouse has won since the plan of giving dinners to the low ratio houses was established. For December the carhouse operated 5,565 miles per accident, whereas 2,500 miles per accident is generally considered good.

The poorest showing of the month was made by the Seventh Street house, which showed 1,190 miles per accident. However, that line runs over a number of congested district streets, including big jobbing and retail sections, and also through sections with many small cross streets.

Jitney Regulatory Measure Introduced

All jitneys and buses are declared to be common carriers and are placed under the control and supervision of the Public Utilities Commission, the same as electric railways and railroads, in the act before the Rhode Island Legislature upon which a public hearing was held recently before the House judiciary committee.

The outstanding feature of the act is that persons, firms or corporations seeking to operate jitneys must first obtain a certificate of necessity and convenience requiring their operation. This throws the burden of proof upon the jitney operator to convince the commission in the case of proposed competition with an electric railway that the auto service is a necessity.

The measure is very far-reaching in its scope. It has the approval of the recently organized United Electric Railways, which took over the electric railways in Providence, R. I., and the metropolitan district, and has the backing of the Republican organization, which controls the Legislature.

The act, which is patterned after the Connecticut law, with modifications to meet conditions in Rhode Island, would become operative on July 3.

Transportation News Notes

Money Appropriated for Traffic Signals.—The finance committee of the Atlanta City Council on Jan. 11 appropriated $5,000 for the installation of six additional traffic towers in the downtown section of the city, to be placed within the next sixty days. The action followed recommendation for additional towers by the city electrician due to the unusual success that has been obtained by the tower recently constructed at Five Points, one of the city's most congested districts, in the control of traffic.

Conductors Sentenced for Pilfering.—By collecting cash fare receipts thrown away in the cars by passengers the London & Port Stanley Railway, London, Ont., discovered that a number of conductors were engaged in systematic pilfering. The process was to separate the two-ply tickets and to punch the auditor's portion for a shorter trip than that paid for. Two conductors who were arrested on warrants pleaded guilty to theft charges and were sentenced to indeterminate terms of three months to two years imprisonment.

Reargument on Jitney Case Refused.—The Court of Errors and Appeals of New Jersey on Jan. 13 denied the motion of the Public Service Railway for reargument of the case in which the court recently affirmed the action of Vice Chancellor Griffin in refusing to enjoin the operation of jitneys alleged to be running in competition with the railway illegally. The refusal of the Court of Chancery was based upon the ground that the railway had no standing to enforce in a court of equity its claim that jitneys were unlawfully pre-empting the streets.

One-Man Cars Will Operate.—Sixteen new one-man cars will begin operation in Dayton (Ohio) on March 1. M. Ackerman, general manager of the Cincinnati & Dayton Traction Company, made this announcement after the City Council of Dayton passed an ordinance, permitting use of these cars. Fares will be 5 cents for the first six months. If a loss is shown, the fare will be raised to 6 cents. If at the end of another six months, there is a profit there will be a reduction to 5 cents, and in the event of another loss the fare will remain at 6 cents.

Increase in Fares Sought in Reading.—The hearing of the application of Reading Transit & Light Company (Reading, Pa.) for an increase in fares in Reading has been reopened by the Pennsylvania Public Service Commission, upon application of the company. The company says the fare allowed by the commission was not sufficient to enable it to earn the rate of return allowed. The commission placed a valuation of $6,000,000 on the company's property and fixed the rate of return at 7 per cent plus an extra 3 per cent for depreciation. It ordered a reduction in fares of from 8 cents in the Reading zone, with four tickets for 30 cents and 9 cents outside the Reading zone, with four tickets for 34 cents to a 7-cent cash fare and eight tickets for 50 cents.

Reduced Party Tickets Offered.—Party tickets offering reduced fares to groups of twelve or more patrons traveling together have been placed on sale by the Monongahela Power & Railway Company, Fairmont, W. Va. The rate is 6 cents for each zone, and will amount to a saving of 15 cents on a dollar, under the price of one-way fares. The offering of this innovation is the result of a suggestion made by President George M. Alexander to the railroad department in the general plan of that executive to augment travel.

4,350 Killed at Crossings in Three Years.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has appealed to automobilists to look carefully before crossing railway tracks, and to take no chances in crossing in front of oncoming trains, in a New Year's pamphlet issued to the public. The suggestion is made that the driver ask someone to supervise his driving, and that he will learn to be careful. During the period from 1917 to 1920 4,350 persons were killed and 12,750 were injured in automobile accidents at railway crossings, the pamphlet states.

Traffic Signals Successful.—The City Council of Houston, Tex., has tried an electric traffic signal at the corner of Main Street and Preston Avenue, and the device has been found so successful that Mayor Holcombe announces that such signals will be installed at once at all corners on Main Street. It is planned later to install similar control signals on Fannin Street and Texas Avenue, which will include all the principal streets in the business district. The signals used show red to stop, amber to warn that a change is to be made and green to indicate the street is open. The company has asked the riding public to observe various points such as cleanliness of the cars and equipment, neatness and appearance of the men, cheerfulness, ease of starting and stopping cars, promptness in maintaining schedules, clearness and accuracy in calling streets, courtesy and kindness to passengers, politeness, application to duty, etc., and asks further that letters of commendation be written the company where it is noted they are deserved by the men. On Christmas day the uniforms will be awarded the winners of this unique contest.

Personal Mention

G. S. Wills Advanced to Manager

Has Been Assistant to Vice-President of Wheeling Traction Company for Past Year

G. S. Wills, who has been assistant to the vice-president of the Wheeling (W. Va.) Traction Company for the past year and a half, has been appointed general manager to succeed C. P. Billings. Mr. Billings will continue as general supervisor of the Wheeling company, but will spend most of his time away from the city looking after the recent acquisition of the West Penn Power Company and the development of properties in Pennsylvania.

G. S. WILLS

Few men have emerged from the subordinate to the high executive positions of traction companies better grounded in the work than Mr. Wills. He was born in Norfolk, Va., in 1884. Mr. Wills had barely reached his majority when he secured employment under General Manager Derrick, of the Oneonta & Mohawk Valley Railway, Oneonta, N. Y. He manifested an ambition to reach the top and from the very beginning became a close student of the details of electric railway operation. He remained under Mr. Derrick from 1905 to 1906, when he secured a place as an apprentice in electrical engineering with the General Electric Company at Schenectady, N. Y.

Leaving this employment in 1907, Mr. Wills went with the Metropolitan Street Railway, New York City, as general carhouse electrician. He later attended Pratt Institute of Science and Technology in Brooklyn, N. Y., and was graduated from a two-year course in applied electricity.

Following Horace Greeley's advice, Mr. Wills then went West. He spent two and one-half years in the copper mining districts of Arizona, where he gained valuable experience in installing electrical equipment. But the street railway business won him again and he returned East and entered the transportation department of the Citizens' Traction Company at Oil City, Pa. In six months he was made superintendent of the Franklin Division. In 1916 he became connected with the West Penn interests at Pittsburgh, first with the general sales manager as light salesman, then as power salesman, and finally as assistant to the vice-president in charge of the commercial department.

Mr. Wills went to Wheeling in September, 1920, as assistant to Vice-President Billings.

C. S. Morgan Wins $500 Prize

Charles Stillman Morgan, economist in the Bureau of Valuation of the Interstate Commerce Commission, is the winner of the $500 prize in the 1921 economic essay contest conducted by Hart, Schaffner & Marx. "The Regulation and Management of Public Utilities" is the subject of the essay which won the second Class A prize.

Mr. Morgan's training and experience have centered on the study of public utility questions, and his article is based on a comprehensive survey of the situation. It is considered in many quarters as the most authoritative and inclusive study made since the commission system of state regulation has been generally accepted. Mr. Morgan dwells particularly on efficient management, comparing the possibilities under the former methods, which allowed the companies almost unrestricted freedom, and the present conditions. After an unprejudiced presentation of the advantages and disadvantages of each, the author concludes that it is proper to reward management but not capital for increased efficiency.

Mr. Morgan was at one time professor of economics and of political science at Marietta College, Ohio.

Donald F. Hine Made Associate Western Editor

Donald F. Hine, connected with the ELECTRIC RAILWAY JOURNAL in New York as editorial representative, has been transferred to Chicago as associate to Harry L. Brown, western editor of the ELECTRIC RAILWAY JOURNAL and BUS TRANSPORTATION.

Mr. Hine joined the staff of the ELECTRIC RAILWAY JOURNAL in the fall of 1920. Since then he has devoted his attention to the preparation of articles of an engineering nature.

Mr. Hine was born in Fishers Island, N. Y. After completing the regular course in electrical engineering at the Sheffield Scientific School of Yale University he spent a year at the same institution doing special engineering work in the graduate school.

McPherson Directs East Bay Electric Division

Leaves Post as Assistant General Superintendent of Pacific Electric Railway —Was Captain of Engineers

J. C. McPherson, assistant general superintendent of the Pacific Electric Railway, Los Angeles, Cal., on Jan. 1 was appointed superintendent of the Southern Pacific Company's electric suburban lines in Oakland, Alameda and Berkeley, with headquarters at Oakland, Cal. These lines, formerly under the Western Division, are now designated as East Bay Electric Division.

Mr. McPherson's connection with electric railway interests has been extensive.

When the interurban lines serving Los Angeles and its surrounding territory were consolidated in 1911 into the present Pacific Electric lines, Mr. McPherson was appointed superintendent of the Northern Division. Two years later he was transferred to Oakland as superintendent of the Oakland, Alameda and Berkeley electric lines of the Southern Pacific. He remained at this post until the United States entered the war, when he went to France as Captain of Engineers in charge of trnsportation at Basseus Docks, Bordeaux.

J. C. MCPHERSON

In 1919 he returned to the Pacific Electric Railway as assistant general superintendent, which position he has held until his recent appointment.

Mr. McPherson was born in Ireland, coming to America at the age of sixteen. For some time he was at Raton, N. M., in the machine shops of the Atchison, Topeka & Santa Fe Railway. In 1895 he became motorman on the Los Angeles & Pasadena Railway, the Pacific Electric Railway's first interurban line. This line was 10½ miles in length and operated fifteen cars, and was the beginning of the present Pacific Electric system.

In 1900 Mr. McPherson was advanced to the position of dispatcher and was later promoted to other positions, until in 1907 he became superintendent of the Los Angeles Interurban Railway, which largely comprised what was known as the Traction System, including all Los Angeles city lines. Mr.

McPherson's steady advancement has come as recognition of his marked ability and his latest promotion will provide a more extensive field for his services.

Fred Durant, Troy, N. Y., for twenty-eight years connected with traction companies, has been appointed traffic superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J. Mr. Durant has filled several responsible positions with the United Traction Company, operating in and about Troy and Albany, N. Y., and for several years was traffic superintendent of that concern.

Gurdon W. Wattles, for many years prominent in the electric railway field, and chairman of the board of directors of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has resigned from this position. He intends to move to California. The position of chairman has been abolished and hereafter the president of the company will preside at the board meetings.

John S. Bleecker, New Orleans, La., is now associated with the Electric Bond & Share Company of New York, N. Y., which has taken over the holdings of the American Cities Company. Mr. Bleecker was formerly general manager of the New Orleans Railway & Light Company, and subsequently was associated with the Myles Salt Company. During his three years stay in the Crescent City, he took part in many of the civic affairs of the city and State, and held membership in the Association of Commerce, the New Orleans Rotary Club and other local organizations.

Obituary

Edgar A. Brehm, manager of the Western Electric Company's telephone distributing branch at Philadelphia, Pa., was killed in the recent wreck on the Philadelphia & Reading Railroad. Mr. Brehm was graduated from Ursinus College in 1910, and became a student at the Hawthorne works of Western Electric Company. He served in the company's offices at Dallas, Cleveland and Philadelphia. During the war he was captain in the Quartermaster's Corps.

Henry F. Noyes, since 1917 vice-president of the Brooklyn City Railroad, died on Jan. 14, at his residence in Brooklyn. Aside from his interests in the electric railway field, Mr. Noyes had connections for many years with the cotton business as a commission merchant, and member of the firm of C. Bauscher & Company. He was a director of the Home Insurance Company of Brooklyn, the Brooklyn Trust Company and the Brooklyn Savings Bank.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

General Electric Investigation Ordered

Counsel of General Electric Company Request that Charges of Samuel Untermyer Be Inquired Into

Announcement was made in Washington on Tuesday that as a result of letters to the Department of Justice from counsel of the General Electric Company and also of charges made by Samuel Untermyer, counsel of the Lockwood legislative committee, the Attorney-General has ordered an investigation of the General Electric Company to ascertain if it has violated any federal laws.

The Attorney-General said that he expected that the minutes of the Lockwood committee would be available to Department of Justice investigators. If violations of federal laws are uncovered, the department will proceed against the company in the United States courts, while if any departures from state statutes are found, this information will be turned over to counsel of the New York State investigating committee.

Acting upon the Lockwood committee charges, the department will investigate the following questions involved in accusations against the company: Whether it maintains an unlawful monopoly of tungsten incandescent lamps; whether it has made unlawful contracts; whether it has manipulated its accounts and evaded the payment of excess-profits taxes, and whether it has been operating in violation of a decree handed down by federal courts in Ohio in 1911.

Experts from the Internal Revenue Bureau will be called upon to assist the Department of Justice in examining the General Electric's books and tax returns. The Attorney-General said that he would detail three members of his department to conduct the investigation.

Coal Buying Increases

Signs of the anticipated buying movement against a possible coal strike this spring are beginning to appear. Throwing off the holiday sluggishness, industries are again getting into operation, but with little increased speed. This slow improvement, coupled with a decided tendency to make overtures for future requirements, has halted the decline in bituminous production and prices.

Production was greatly improved during the first week of January. The total output was 7,460,000 tons, as compared with 5,996,000 tons the week preceding. Loadings on the first two days of last week—Jan. 9 and 10—indicate a further increase for that period.

The stock pile is being left more or less undisturbed and current needs are being largely supplied from the spot market. The removal of the transportation tax and the present extremely good values offering have about convinced buyers that prices will not be much lower, at least until a wage readjustment is made. However, the urgency of fuel requirements is not yet manifesting itself to the extent of any sharp turn for the better.

Ohio Brass Completes Malleable Iron Foundry

Operations have been started in the recently completed malleable-iron foundry of the Ohio Brass Company at Mansfield, Ohio, according to announcement of the company. The addition to the plant is on land adjoining the older Mansfield works, but has its own receiving and shipping facilities. There are three buildings in the addition, including a foundry, a powdered-coal plant and a compressor building. The foundry proper has 100,000 sq.ft. of floor space with provision for seventy-two machine molders. A feature of the plant is the use of powdered coal as fuel for the core ovens, melting furnace and annealing furnaces. For the coal-powdering operation a building 35 ft. x 70 ft. x 55 ft. has been erected, and a 4-in. pneumatic tube is used for blowing the coal to the various points where it is used in the foundry. In the first test run three tons of powdered coal were blown to the furnaces in less than five minutes. A vacuum cleaning system is to be used to keep the coal building free from coal dust and dirt.

Copper Production Resumed

The Anaconda Copper Mining Company, which with other important producers has had its mines closed since last spring, resumed operations this week. Production of copper on a large scale is not expected for several months. It is believed, however, that within thirty days output will be running at the rate of 5,000,000 lb. a month, and that this will be gradually increased.

Prospects of an early resumption by other large producers have been enhanced by the general improvement in the copper situation. The available surplus of the metal is now estimated to be less than 450,000,000 lb., a figure which, in the opinion of leaders of the industry, would presage a copper famine under normal market conditions.

Calumet and Hecla, the leading producer in the lake district, will reopen its mines April 1. Other important producers, now closed, will be operating, it is believed, within three months. Some that did not close were Kennecott, Cerro de Pasco, Wolverine, and Miami.

One of the favorable aspects of the export situation in copper is seen in the announcement that the Copper Export Association has anticipated $10,000,000 of notes due Feb. 1, 1923, of a total issue of $40,000,000 sold to finance the sale abroad of 400,000,000 lb. of copper.

Unemployment Increased

Unemployment increased by 4.7 per cent during December according to the monthly survey of the U. S. Employment Service. The survey covers 1,428 firms located in sixty-five of the principal industrial centers of the country. These concerns were employing 1,493,107 workers on Dec. 31. The decreases in employment were mainly in industries supplying food, beverages, chemicals; stone, clay and glass products; tobacco manufactures; vehicles for transportation and railroad repair shops. Increases in employment are shown in lumber, leather, paper and printing, and all metal products.

Loan to Berne Railways

Electrification of Berne railway lines, which are owned by private transportation companies, is to be aided through a Government loan plan, according to a despatch from the American Legation at Berne, based on information published in Journal de Genève of Nov. 30, 1921.

The Department of Railroads, with the approval of the Federal Council, will submit to the Federal Chambers immediately a request for a loan of 11,000,000 francs to be used for this electrification, which is in line with similar development being undertaken.

Sale of Public Utilities in Brazil

Details of the proposed sale of the electric light, street car, and water systems of Aracaju, State of Sergipe, Brazil, have been forwarded to the Bureau by Ammerican Commercial Attaché W. L. Schurz. Bids for the purchase of these enterprises are to be received until Jan. 17, 1922.

Further information regarding this proposed sale and the manner of submitting bids can be obtained from the Electrical Equipment Division of the Bureau of Foreign and Domestic Commerce, Washington, D. C., by referring to Exhibit No. 371.

Metal, Coal and Material Prices

Metals—New York	Jan. 17, 1922
Copper, electrolytic, cents per lb., delivered..	13.75
Copper wire base, cents per lb........	15.12½
Lead, cents per lb.....	4.70
Zinc, cents per lb........................	4.72½
Tin Straits, cents per lb.....	32.12½
Bituminous Coal, f.o.b Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.......................	$4.80
Somerset mine run, Boston, net tons........	1.80
Pittsburgh mine run, Pittsburgh, net tons ..	2.15
Franklin, Ill., screenings, Chicago, net tons..	1.80
Central, Ill., screenings, Chicago, net tons...	1.83
Kansas screenings, Kansas City, net tons....	2.50
Materials	
Rubber-covered wire, N. Y., cents per lb....	6.50
Weatherproof wire base, N. Y., cents per lb..	16.25
Cement, Chicago, net prices, without bags..	1.97
Linseed oil (5-bbl. lots), N.Y., cents per gal.	75.00
White lead (100-lb. keg), N.Y., cents per lb.	12.25
Turpentine (bbl. lots), N.Y., cents per gal.	91.00

Rolling Stock

United Railways, St. Louis, Mo., through Receiver Perkins has announced that it will apply to the court for permission to purchase fifty motor cars.

Georgia Railway & Power Company, Atlanta, Ga., received during the past year from the Cincinnati Car Company fifteen double-truck PAYE motor cars, the equipment details of which are as follows:

Number of cars ordered	15
Name of road	Georgia Railway & Power Co.
Date order was placed	February, 1920
Date of delivery	May, 1921
Builder of car body	Cincinnati Car Co.
Type of car	Double truck PAYE motor
Seating capacity	48
Weight:	
Car body	16,000 lb.
Trucks	11,000 lb.
Equipment	8,200 lb.
Total	35,200 lb.
Bolster centers, length	20 ft. 6 in.
Length over all	44 ft. 6 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 1 in.
Height, rail to trolley base	11 ft 6⅝ in.
Body, wood, semi-steel, or all steel	Steel
Interior trim	Natural cherry
Headlining	Nevasplit
Roof, arch or monitor	Arch
Air brakes	Westinghouse Traction Br. Co.
Armature bearings	Sleeve
Axles	J. G. Brill
Car signal system	Consolidated Car Heating Co.
Car trimmings	Cincinnati Car Co., Bronze oxydized.
Center and side bearings	Symington
Conduits and junction boxes	Flexiduct
Control	General Electric K-35-G
Couplers	None
Curtain fixtures	Curtain Supply Co.
Curtain material	Fabrikoid
Designation signs	Keystone-Vestibule
Door operating mechanism	Cincinnati Car Co.
Fare boxes	None
Fenders or wheelguards	H. B. Life guards
Gears and pinions	General Electric, Grade M.
Hand brakes	Cincinnati Car Co., Drop handle.
Heater equipment	Consolidated Thermostat Control.
Headlights	Electric Service Supply, Golden Glow SR-95.
Journal bearings	Sleeve
Journal boxes	J. G. Brill
Lightning arresters	Westinghouse MP.
Motors, type and numbers	GE, 201-I, 65 hp., 2 per car.
Motors outside or inside hung	Outside hung
Paint, varnish or enamel	Vitralite enamel
Registers	Ohmer
Sanders	Ohio brass
Sash fixtures	O. M. Edwards
Seats	Hale & Kilbourn, 400-AWO
Seating material	Wood frame, rattan panel seat.
Slack adjuster	Anderson
Springs	J. G. Brill
Step treads	Cincinnati Car Co.
Trolley catchers or retrievers	Keystone
Trolley base	Trolley Supply Company
Trolley wheels or shoes	Wheels
Trucks	J. G. Brill, 39E1
Ventilators	Railway Utility Company
Wheels (type and size)	Cast iron, 33 and 22 in.

Track and Roadway

Ohio Valley Electric Railway, Huntington, W. Va., will replace approximately 5 miles of trolley line on the Huntington division this winter.

Tampico Electric Light, Power & Traction Company, Tampico, Mex., will double track its lines on the principal streets and make important extensions into new territory.

Dallas (Tex.) Railway may soon b called on to build a double-track con crete viaduct across the Trinity Rive bottoms for its lines serving Oak Clif the portion of the city on the west sid of the river. The traction company the time the new franchise was grante built a double-track concrete structur over the tracks of the steam railwa lines, but from the point where th structure crossed the steam lines, th concrete work was stopped and wooden trestle was built to connect th lines on the viaduct with the tracks o the earth embankment through th river bottoms. The viaduct, officials o the traction company say, will cos about $250,000 or $300,000 and that th company cannot raise funds at thi time to build it.

Power Houses

Paducah (Ky.) Electric Company considering plans for furnishing Southern Illinois with electric current fo the operation of its factories and providing lighting facilities.

Georgia Railway & Power Company Atlanta, Ga., has announced that wor will be resumed immediately on th Tugalo dam and power house in nort Georgia. Completion of this plant wil increase the company's water power 4 per cent.

Trade Notes

Fred F. Stockwell, of the Barbour-Stockwell Company, a street railwa supplies house, Cambridge, Mass., wa elected secretary of the New Englan Foundrymen's Association, at the recen annual meeting held in the Exchang Club, Boston.

Ajax Metal Company, Philadelphia Pa., has announced the appointment o Zeno D. Barns as manager of the Cleveland office to succeed Louis E. Punell, deceased. Mr. Barns has been connected with the Westinghouse Electric & Manufacturing Company and the Westinghouse Air Brake Company.

New Advertising Literature

Gould Manufacturing Company, Seneca Falls, N. Y., has issued Bulletin No. 123, describing and illustrating steam turbine-driven centrifugal pumps.

Delta-Star Electric Company, Chicago, Ill., is distributing bulletin 37, describing high-tension outdoor substations. This bulletin contains sixty-four pages and is complete with illustrations of substations for interurban railways and other work.

The Wagner Electric Manufacturing Company, St. Louis, Mo., is distributing a folder relative to shaft sizes used in its industrial motors. The company has also issued bulletin 129, which describes and illustrates other important features of Wagner Pow-R-full motors.

Peacock Points With Pride

The 12-52 Peacock Improved Brake

for Heavy Electric Traction

The choice of the Peacock Improved Brake for such splendid cars as those of the New York Municipal Railway—as well as other big subway, heavy interurban and big city cars—is a source of considerable gratification to us. Since we have been specializing in hand brake design and manufacture for over eighteen years, we feel safe in claiming to have the necessary expert technical knowledge and experience to put the right equipment on any type of car.

We can always count in advance—upon Peacock Brakes being specified, wherever experienced traction engineers are handling the work.

The Peacock 12-52 Improved Brake is especially suitable for double truck cars of over 35,000 lbs. in weight. It will serve without fail as an emergency brake, and when the cars are off the line, without air pressure on the cylinders, it will hold them on any grade about the shops or in the yards.

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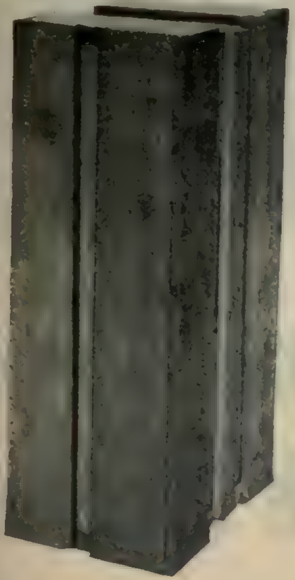
Standard Package



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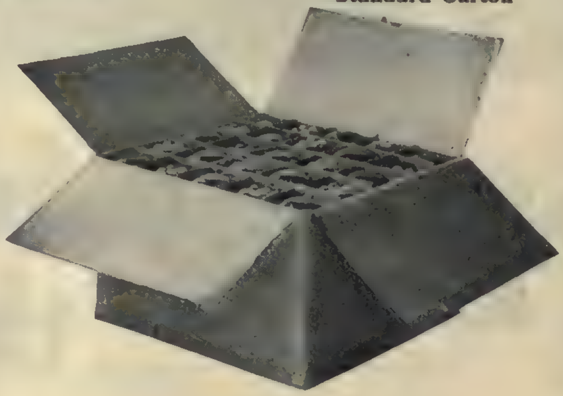
Easier handled and stocked

Standard Carton



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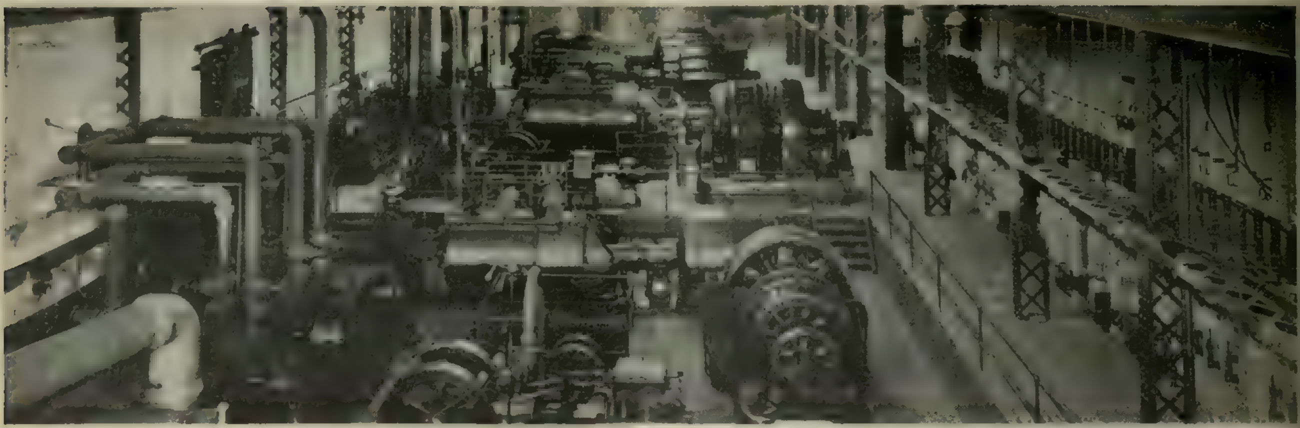

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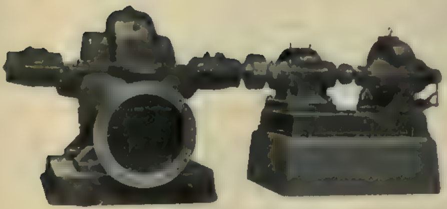
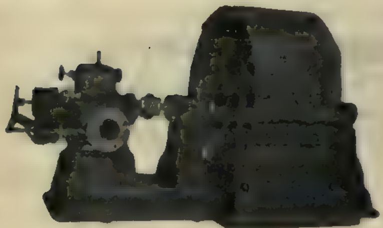
Small Units for the Large Plant

DEPENDABILITY of operation when expressed in tie-ups of trolley service takes on a definite meaning, which is far removed from a mere talking point. Dependable auxiliary drive means an insurance against interruption of service.



Condenser Pump

The first reason for Terry dependability lies in the fact that Terry turbines receive their energy directly from the boiler, avoiding the cycle of main unit or house turbine, generator, switchboard, fuses and wiring required by motors. They are therefore free from all external disturbances except boiler failure. Extreme simplicity of construction reduces internal disturbances to a minimum, a fact proved in over 8,000 installations in successful operation.



Forced Draft Pump

For boiler feed, condenser service, forced draft and excitation your drive should be

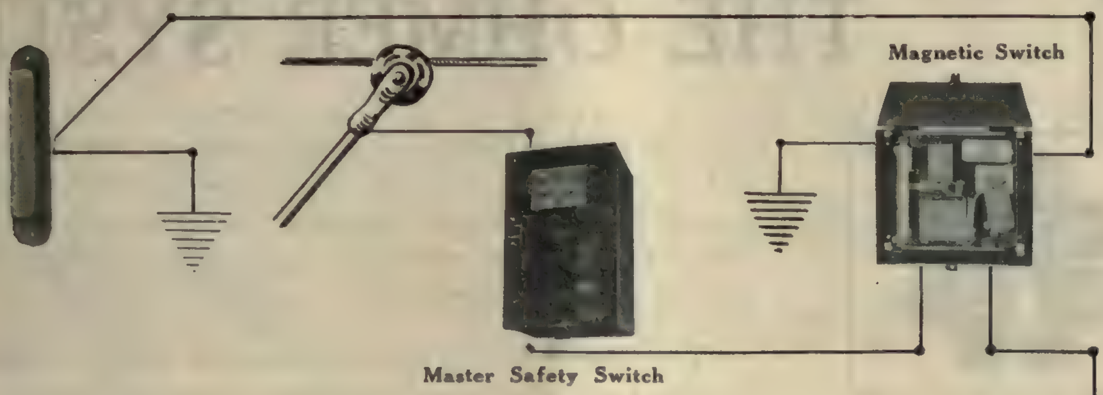
Duplex Exciter

THE TERRY TURBINE

Offices in Principal Cities
in U.S.A. also in Important
Industrial Foreign Countries

The Terry Steam Turbine Co.
Terry Sq. Hartford, Conn. USA.

T-764



CONSOLIDATED
THERMOSTATIC CONTROL
for electric heaters

Keeps every car on your system heated to the same temperature.

Prevents waste of current by automatically cutting off the heaters when the desired car temperature has been reached—only the amount of current required to heat a car is used—and no more.

Saves over 50% of the current used by the heaters with hand controlled switches.

An actual expense reducer—not a plaything.

Consolidated Thermostatic Control

with

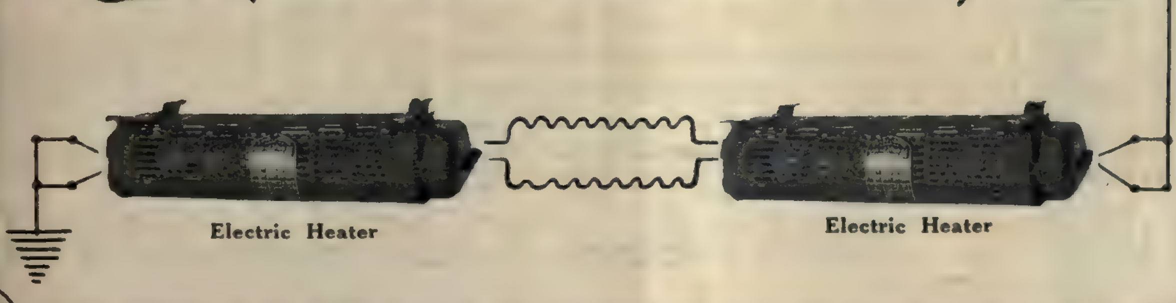
Consolidated Electric Heaters

are the recognized standard heating equipment used on the principal Electric Railways of America and many foreign countries.

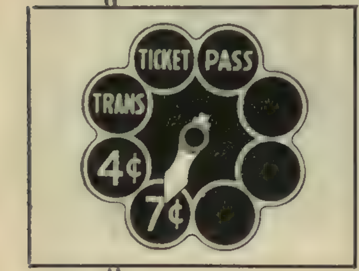
CONSOLIDATED CAR-HEATING CO.

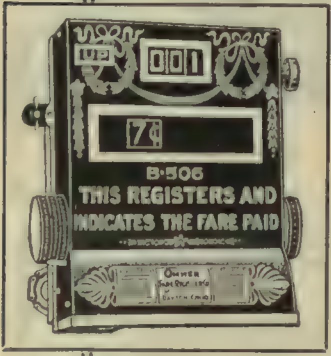
Albany, New York

New York City Chicago Coaticook, Quebec



THE OHMER SYSTEM



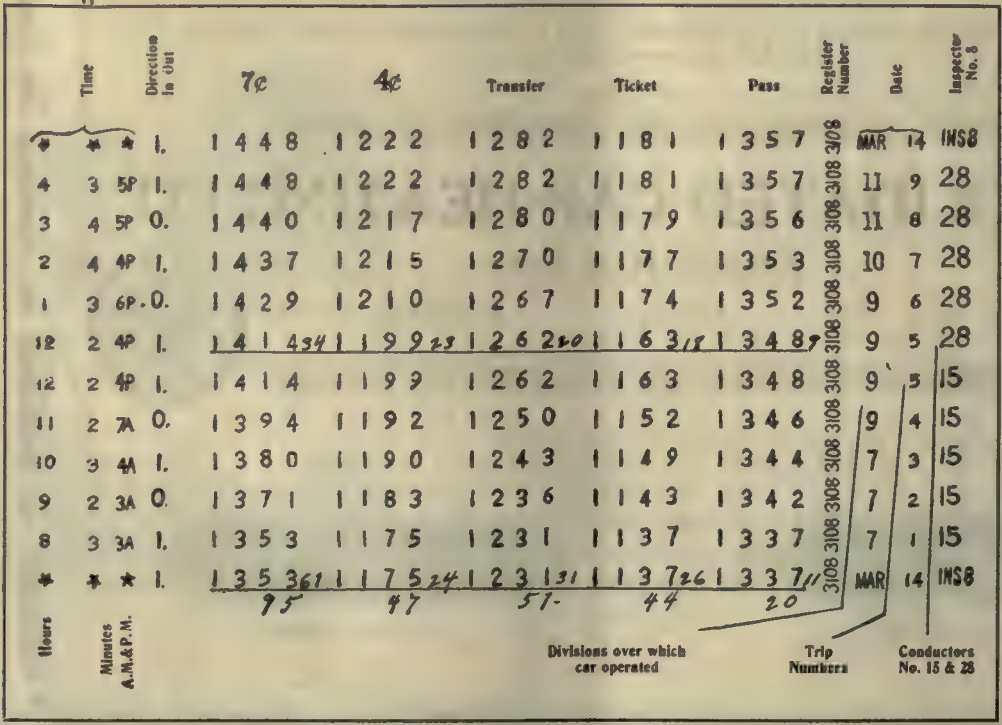


The Ohmer System of fare accounting has stood the test of good times and bad. It is now recognized by all careful and progressive managers as the only method which actually and adequately protects the income of an electric railway company at its source.

The Ohmer System controls the work of the conductors in such a way that they find their own best interests served by doing their work honestly and faithfully. Under the Ohmer System, a good conductor becomes a better one and a poor conductor becomes at least a fair one, or he looks somewhere else for a job.

Let us know something of your fare accounting problems.

Ohmer Fare Register Company
Dayton, Ohio



Time			Direction In Out	7¢	4¢	Transfer	Ticket	Pass	Register Number	Date		Inspector No. 8
*	*	*	I.	1448	1222	1282	1181	1357	3108	MAR	14	INS8
4	3	5P	I.	1448	1222	1282	1181	1357	3108	11	9	28
3	4	5P	O.	1440	1217	1280	1179	1356	3108	11	8	28
2	4	4P	I.	1437	1215	1270	1177	1353	3108	10	7	28
1	3	6P	O.	1429	1210	1267	1174	1352	3108	9	6	28
12	2	4P	I.	1414 34	1199 23	1262 20	1163 18	1348 9	3108	9	5	28
12	2	4P	I.	1414	1199	1262	1163	1348	3108	9	5	15
11	2	7A	O.	1394	1192	1250	1152	1346	3108	9	4	15
10	3	4A	I.	1380	1190	1243	1149	1344	3108	7	3	15
9	2	3A	O.	1371	1183	1236	1143	1342	3108	7	2	15
8	3	3A	I.	1353	1175	1231	1137	1337	3108	7	1	15
*	*	*	I.	1353 61	1175 24	1231 31	1137 26	1337 11	3108	MAR	14	INS8
				95	47	51-	44	20				
Hours	Minutes A.M.&P.M.											

Divisions over which car operated

Trip Numbers

Conductors No. 15 & 28

Get Rid of Weak Pins

Use Brake Pins that won't break!

BOYERIZE!

Use Wear-Defying Equipment

Motion involves friction and you can't have friction without some wear. Lubrication reduces friction, but you can't keep brake-rigging oiled as it should be to eliminate wear. It's too completely exposed. Weather, dirt and dust get in their work in spite of all.

Therefore you've got to trust to frequent inspections to detect the worn-out pins and bushings, the bearing plates worn thin, and the general lost motion due to played-out parts. Better reinforce your inspection service and at the same time reduce your costs by using materials which resist the wear of friction and which last about four times as long as ordinary untreated steel.

Here's a partial list of Boyerized steel products which are saving money for many roads by cutting down the frequency of replacements and by reducing the number of break-downs on the road.

Boyerized Brake Hangers.
Boyerized Brake Lever Pins and Bushings.
Boyerized Wearing Plates between the Bolster and Bolster Carrier.
Boyerized Wearing Plates between the Pedestal Straps and the Journal Box.
Boyerized Pins and Bushings for Door Fixtures.

BEMIS CAR TRUCK COMPANY

Springfield, Mass.

The Outlook for the Electric Railway Industry

BY JAMES P. BARNES

President Louisville Railway

THE utilities—by their service ye shall know them, and beyond doubt as they serve they shall be rewarded, and, as they fail to serve, condemned.

A new spirit is abroad—born of the world throes of warfare, and today the true measure of service is the Golden Rule. The service is the thing and we must seek, not so intently remuneration for, but opportunity to serve. This is not to intimate that we can serve at unremunerative rates, but rather that if we ask and grasp our opportunities for service of the broadest kind, remuneration will follow as a matter of course.

Well and comfortably to transport from home to factory, store and office an urban population is no small service to a community, but it is not the only opportunity for service. The shopper, the theatergoer, the pleasure seeker have each their claim upon the transportation service, and upon these elements, together with the units which go to make up the peak requirements of a system, will the base and rush-hour schedules be built. The obligations of courtesy and convenience in service are too well accepted to require comment.

THE BUGBEAR OF TRAFFIC CONGESTION

But is this all the city railway can do for its patrons? Is there no element of service as yet undemanded because unforeseen? Is there no means by which the plant may be made more widely useful to the community and its burdens—thus incidentally distributed over a wider field of uses?

I think there is, and that the way to solution of the problem lies in the study of what is today the most troublesome of every city's problems, and which, so far from being met, is actually daily becoming more aggravated. I refer to traffic congestion.

The downtown city streets of today are no more adequate for the requirements they are called upon to meet than were the cowpaths of Colonial days adequate to become the downtown streets of New York and Boston. Relief is imperatively demanded, but by what means?

Widening of thoroughfares is impracticable because of the enormous expense involved. Yet what else will suffice?

For the sake of the practical let us for the moment be visionary. Suppose the sidewalks where now inadequate were to be widened by extension into the street, and the street to be at the same time widened by the elimination of the long line of parked vehicles which is a daily sight in every city. In every city a judicious elimination of vehicle parking would leave a maximum walk of say three blocks to any store or office building. How much real hardship would this entail to the average shopper?

The real congestion of our streets arises not from the commercial delivery vehicle so much as from the private conveyance. But is there not a way by which we of the electric railways might assist even in the elimination of the commercial vehicle from street parking?

Surely it is false economy from the viewpoint of a community that delivery facilities for its merchandise distribution be needlessly extended and reduplicated. Why should not all merchandise, with a possible few exceptions, be delivered from one vehicle? Mass distribution from business or shopping center to outlying substations and thence door delivery by suitable vehicles would have alike the streets, the machinery wear and tear and the temper of the housewife, who would receive at one delivery all the merchandising that now requires many answers to the doorbell. Visionary? Perhaps, but there is a service which the city railway with its tracks laid and its cheapest per ton-mile facilities at hand could render to the profit of itself and the economy of the community.

The future of the electric railway industry is vast and opens before us like a fairland of opportunity. New means of transportation are within our grasp as feeders and auxiliaries. The auto truck, the auto bus and the trolley bus are all tools to our hands. Dream, visualize, anticipate and fearlessly adopt the worth-while innovations, and the future of the industry is vast indeed!

Abstract of paper presented at meeting of Kentucky Association of Public Utilities held at Louisville, Ky., Nov. 22, 1921. Reprinted from *Electric Railway Journal*, Tenth Ave. at 36th Street, New York City.

York Railways Co., Pa.

MILLER
Trolley Shoes

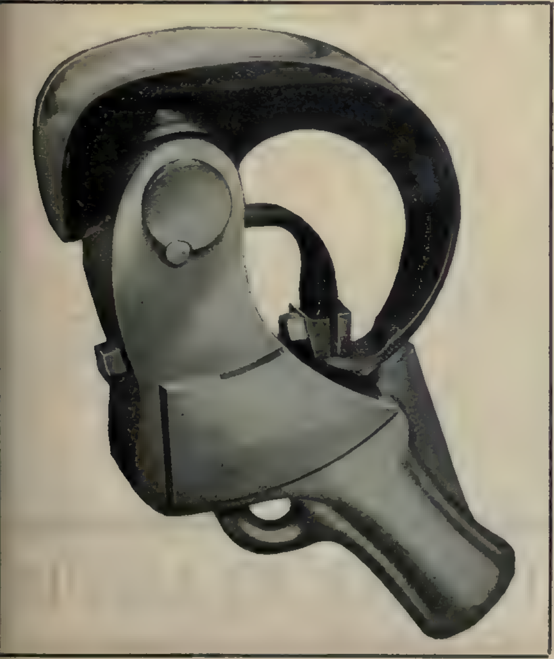
are on the new cars of the York Railways Company, designed for the high-speed 18 mile line between York and Hanover, Pa.

Why?

Because the three-inch smooth sliding contact means far greater current collecting capacity at high speeds—it means elimination of arcing—it does away with cases of jumping trolleys which tear down the overhead. It runs just as well when these cars operate over city lines as at 45 miles an hour in the open—and finally, it shows lower maintenance costs on both wire and shoe, than when wheels are used.

Give Miller Trolley Shoes a trial on your cars.

Miller Trolley Shoe Company
Dorchester, Mass.
Alfred Connor, Denver F. F. Bodler, San Francisco
T. C. White & Co., St. Louis S. M. McClintock, St. Paul
S. I. Waily, Los Angeles
W. F. McKenney, Portland, Ore.



We Believe That—

EVERY factor of importance, contributing towards the maximum in operating efficiency, is incorporated in the design and manufacture of V-K TROLLEY WHEELS AND V-K NON-ARCING HARPS.

You will do well to adopt them as standard on your lines—many electric railways have already done so—simply because of the better results that are obtained from them.

We stand ready to show you on your own road just what advantages they possess over others. Drop us a line requesting details.

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Products

TROLLEY WHEELS:
- V-K Oil-less
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HARPS:
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BEARINGS:
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and Similar Products

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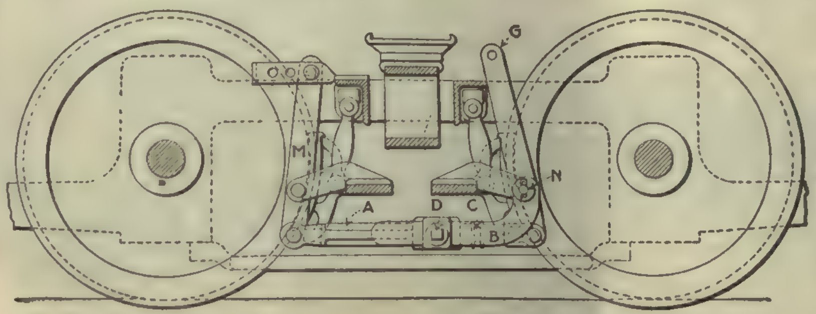
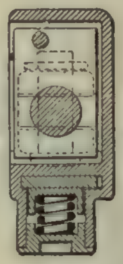
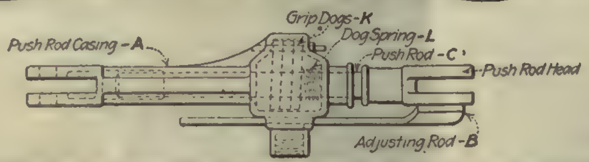
Brake-Rigging Continuously Taut with—





GOULD Slack Adjuster

Specified by United Railways & Electric Co., of Baltimore, for latest safety cars.



Details of the Gould Type Slack Adjuster as applied to an Electric Car Truck

How often you notice a motorman running with brakes partially set up, due to over-anxiety to be sure that all the slack is out of rigging. The waste of power and wear on brake shoes in such cases is appalling.

Remove the incentive to run with brakes set up, by installing Gould Automatic Slack Adjusters, which keep the brakes always ready for instant response to the operator's effort. Incidentally you will save materially on shop expense, which occurs from the necessity of frequent manual adjustments of brake rigging when it is not taken care of by Gould automatic adjusters.

Write today for further information

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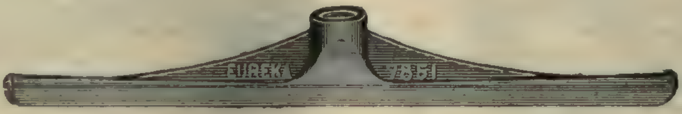
30 East 42nd St., New York City **Works: Depew, N. Y.** **The Rookery, Chicago, Ill.**



Eureka Equipment

Eureka Equipment will help to keep down maintenance costs because it is correctly designed and carefully manufactured from our own special alloys.

We can now make prompt shipments on

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of fresh pure metals only. Cast and turned to finest accuracy and balance. Longest life assured.

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Quick detachable—only 10 seconds to make the change. Their fine construction makes these harps real money-savers.

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They provide the maximum freedom of motion and the correct pressure of any angle of pole. Long extension springs, self-lubricated bushings and roller bearing swivel. Note construction details in the illustration below.

From roof to wire—one high class standard.

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Springfield, Ohio

Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

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McGuire-Cummings Cars are representative of all that is best and most progressive for the successful operation of Electric Railways

¶ For more than twenty years this organization has specialized in the manufacture of city and interurban cars and trucks, safety cars, combination and work cars, snow sweepers and electric locomotives.

¶ We are prepared to construct efficiently and promptly, all classes of rolling stock for the successful operation of electric railways.

McGuire-Cummings Manufacturing Co.

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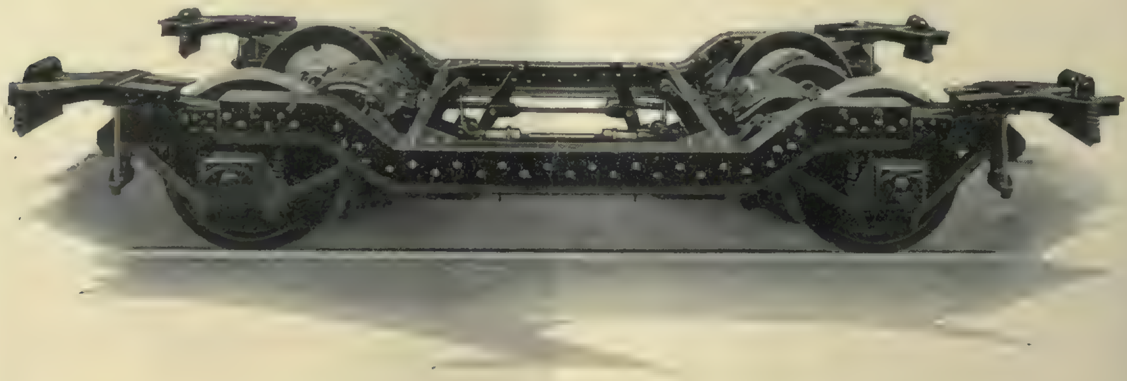
CHICAGO

Upon the Trucks depend the safety and comfort of passengers, as well as the efficiency and economy of the rolling stock



McGuire-Cummings No. 90 Truck designed for one-man Safety Cars

McGuire-Cummings Trucks are representative of the highest development of accumulated experience and inventive skill.

¶ Safety, strength, long life, efficiency and low maintenance cost in service, are economy factors that are outstanding in the design and construction of McGuire-Cummings trucks.

¶ Our engineering department is at your service. We will be pleased to either submit specifications and drawings and to quote prices thereon, or we will submit proposals on specifications furnished.

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Yes, we're building Tracklesstrollicars and motor buses too. Not because we think they're going to take the place of the electric railway car, but because we know there is a new and legitimate additional field for Tracklesstrollicar transportation in connection with railway service.

St. Louis Tracklesstrollicar

Built and developed in accordance with St. Louis Quality car building practice for street railway properties.

Two standard 25 HP. electric motors of the usual type used on safety cars form part of this equipment.

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"The Birthplace of the Safety Car"

Good Brake Shoes

for safety, efficiency and economy, are just as necessary as a good track, a perfect signal system or a powerful head light.

WEIERBACH Brake Shoes

will not break in any service. They make quicker, easier stops. Tests just completed on electric cars, four Weierbach and four metal shoes staggered on trucks, show Weierbach average mileage 25,717—metal 21,144 per shoe. Either M.C.B. or A.E.R.A. Standards.

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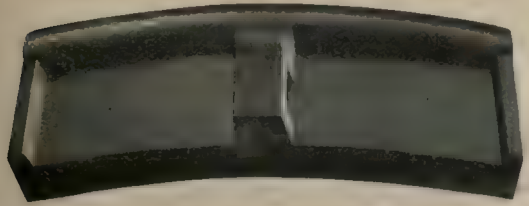
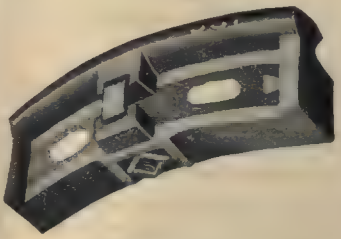
315 American Bank Bldg., Los Angeles, Calif.



Brake Shoes
A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type



Standard Patterns for

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D-67 for Narrow Treads
D-87 for Wide Treads

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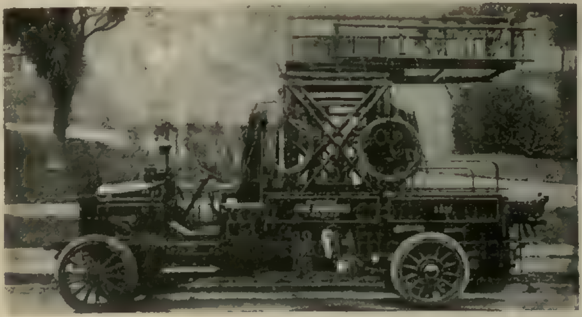

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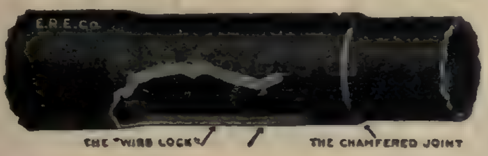

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Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
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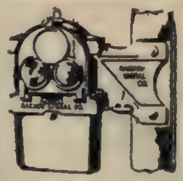

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Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

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Sole Manufacturers of Micanite
Established 1893
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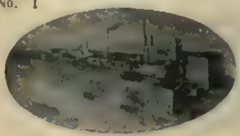

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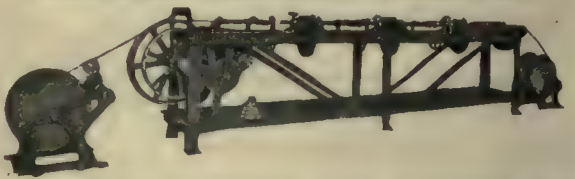

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to consult the

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It may hold the very opportunity for which you have been seeking

If you do not find what you want, perhaps a small ad will help you.

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$5 or less per inch

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***Positions Wanted*—4 cents a word**
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Varnished Cloth and Tape

"AM-DI"
Insulating Varnishes and Compounds

"Dutchess" varnished cloth and tape are bleached and coated at our new plant built especially for the purpose and can be furnished in yellow or black and as cloth or tape of any finish or width.

"Am-Di" insulating varnishes cover a complete line of varnishes and compounds for standard work or for apparatus subject to severe conditions of vibration, oil, moisture, acid and alkali fumes, etc.

Our Laboratory and our experience are at your disposal for the solution of your insulation problems

"Electrical Insulation made by *Electrical Engineers"*

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Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes.

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high-grade R. R. Track and Car Jacks.

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

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Insulating Varnishes and Compounds
For Electric Railways

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Dolph's Chinalak Clear, Baking. Dolph's Chinalak Black, Baking.
These varnishes are china wood oil base, long in oil, high in insulation, water repelling and oilproof.

For Armatures
Dolph's Electric Lacquer. Dolph's Black Finishing No. 3.
Electric Lacquer is a black alcohol solvent varnish, is oil and waterproof and air dries in half an hour. Black Finishing No. 3 is a benzine solvent varnish, absolutely waterproof and air dries in 30 minutes.

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Dolph's Chinalak Clear, Baking. Dolph's Chinalak Black, Baking.
All Varnishes and Compounds guaranteed as represented. Manufacturers of Insulating Varnishes exclusively since 1909.

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The Insulation Specialists
Newark, N. J.
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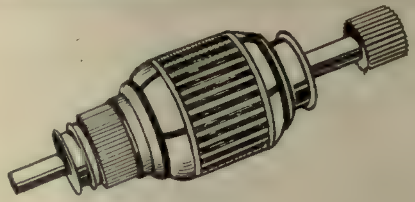

50% Better than Shellac

Di-electric tests conducted by an important middle west company are authority for this statement. "Don-O-Lac stands a 50% higher voltage." Spark jump tests prove Don-O-Lac insulating quality equally as well.

Don-O-Lac on Armatures, Commutator heads, Switches, Circuit Breakers, Tape, etc. is tough, elastic, will not chip or flake, is non-corrosive and is immune from oils.

Are you content without a test of your own, or do you too want superior insulation badly enough to order 5 gallons of the eight pound cut at $2.50 per gallon,—in bbl. lots $2.25 per gallon.

THE DON-O-LAC CO. INC,
ROCHESTER, N. Y.

DON-O-LAC
Insulator

DON-O-LAC MEANS QUALITY

"Superior Coil Winding Machine"

The machine that will meet all your Coil Winding requirements

MOTOR gear driven, built for heavy duty as well as for light coil winding.

Write for particulars that will give you complete information on this machine.

Armature Coil Equipment Co.
3202 Scranton Road
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Manufacturers of Motor Repair Equipment.

"Personnel"—
or just employees?

—a distinction!

Are your trainmen merely hired help, or do they constitute a well-knit, spirited body, proud of their jobs and reflecting the very best of the company's policies?

American Brand Badges, Buttons and Punches lend "distinction" to the user.

American Railway Supply Co.
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Type R-5. Double Register

Accurate Registration

The accurate, dependable registration secured by the use of International Registers assures a complete check on fares, and provides a basis of knowledge in the accounting after collection.

International Registers are made in single and double types for a wide variety of uses. Send for our catalogue.

Manufacturers of Single and Double fare registers, counters, car fittings. Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
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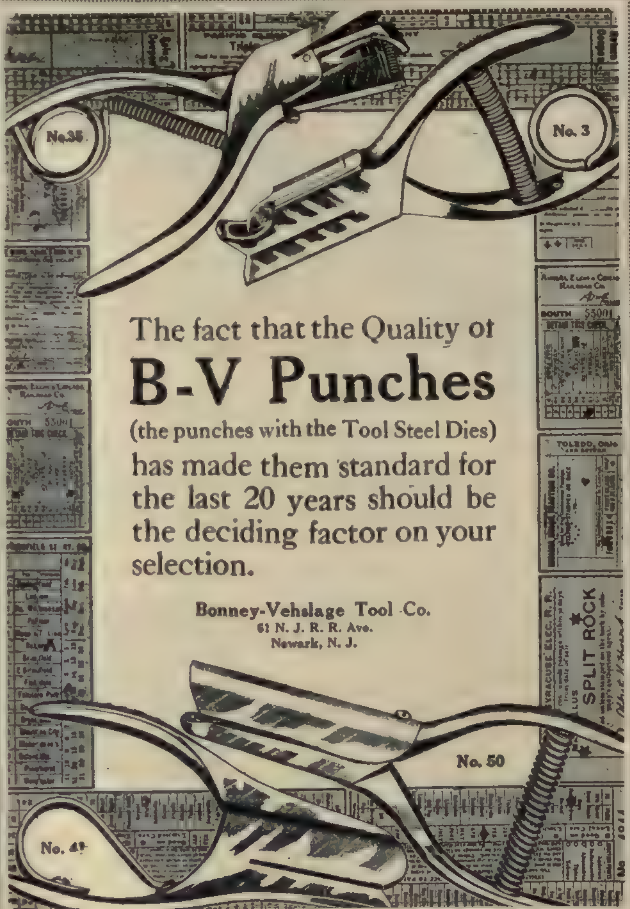

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(the punches with the Tool Steel Dies)
has made them standard for the last 20 years should be the deciding factor on your selection.

Bonney-Vehslage Tool Co.
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Tickets and Cash Fares.
THE CLEVELAND
accommodates both
The Cleveland Fare Box Co.
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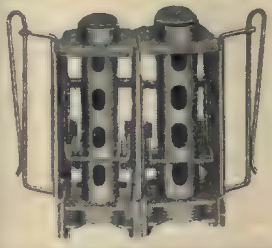
JOHNSON Universal Changer



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The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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Ravenswood, Chicago, Ill.

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GOLD CAR HEATING & LIGHTING CO.
NEW YORK CITY
PATENTED

THERMOSTAT CONTROL EQUIPMENTS

Address All Communications to
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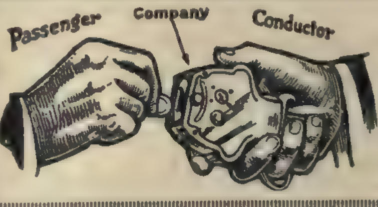
CUTTER ELECTRICAL AND MANUFACTURING CO. PHILADELPHIA
THE CIRCUIT BREAKERS
I-T-E

I. T. E.
Circuit Breakers
for heavy street railway work are the best obtainable. Write for New Complete Catalogue.



Direct Automatic Registration
By the
Passengers
Rooke Automatic Register Co.
Providence, R. I.

A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

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Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
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"Zero"
for
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STANDARD for a THIRD of a CENTURY

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Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

Write us for details.

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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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Johnson Fare Boxes
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FOR ELECTRIC RAILWAYS

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Wheel Presses
Car Wheel Lathes
Boring Mills
Lathes
Hammers
Cranes
General Machine Tools

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A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

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Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

Car Seating, Broom and Snow Sweeper Rattan, Mouldings, etc.

AMERICAN RATTAN & REED MFG. CO.
Brooklyn, N. Y.

AMERICAN means QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

STERLING VARNISH
—that next order

Let us tell you what other roads are accomplishing with Sterling Varnish—in the way of lowering maintenance costs and improving operation.
Consult us about a trial.

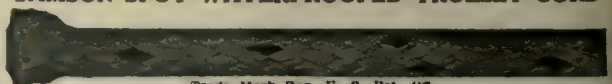
The Sterling Varnish Co., Pittsburgh, Pa.

N-L

Indicating Signals
Mechanical Sanders
Ventilators, Smokestacks
Pneumatic Sanders
Selector Switches, Lanterns, etc.

THE NICHOLS-LINTERN CO.
8404 Lorain Ave., Cleveland, Ohio

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
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8 to 14 in., $4 10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

MASTER mechanic wanted for a city operating 50 city cars. Location North Central States. Give full particulars as to experience and references in first letter. P-369, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

WANTED: master mechanic on electric railway in Central West operating 80 cars, principally Birney safety type. Applicant must be competent to take full charge of shops and car barns and superintendence of all maintenance of equipment. In replying give full details of past experience and with what company. Also state salary expected. P-382, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITIONS WANTED

ALL-round electric railway engineer, 16 years' experience in construction, maintenance, and some knowledge of operation, wishes to connect with electric railway company that will appreciate economy. Hard work and results. Good executive. Any location. PW-380, Elec. Ry. Journal.

CIVIL engineer, college, experienced in railroad and street railway work, industrial housing and industrial plant work; neat draftsman. PW-385, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

MASTER mechanic and superintendent of construction; 18 years' experience on city and interurban properties; personal reasons for desiring change; west central states preferred. PW-384, Elec Ry. Journal, Old Colony Bldg., Chicago, Ill.

MASTER mechanic and electrician, with 17 years' experience, desires position with railroad company operating city or interurban lines. Capable of handling shop and electrical equipment. Can furnish best of reference. PW-381, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

SUPERINTENDENT of Transportation with a proven record of 17 years on large city Suburban and Interurban properties desires a change and will consider any good size city and suburban property that requires a practical superintendent of wide experience. Capable of handling all details of transportation and getting results from employes. Personal reasons for desiring a change. High grade references. PW-372, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

AGENTS AND SALESMEN

Salesman Wanted

Familiar with electric railway and transmission requirements. State age, education, experience and salary expected. AS-383, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

FOR SALE

Ticket Counting Scale

One Avery ticket counting scale. Apply Room 1347 Edison Bldg., Chicago Ill., and inquire for Mr. Kretschmer, Purchasing Agent, Metropolitan West Side Elevated Railway Company.

WANTED

A High Grade Experienced Salesman

having an acquaintance with Central Stations, Power Companies, and Jobbers throughout the United States to sell an established and increasing line of high grade pole and line material manufactured by a large and well established manufacturing company. Give age, experience and salary expected. Exceptional position and future for a man who can show results with a line of acknowledged merit and right prices.

AS-379, Electric Railway Journal
1570 Old Colony Bldg., Chicago, Ill.

USED CARS

For Every Service

Railway Motors

Standardize Your Equipments at Minimum Cost

TRANSIT EQUIPMENT CO.
501 Fifth Avenue, New York

WANTED TO PURCHASE

100 HP. MOTOR

to operate at or about 850 r.p.m. Motor may be either 600 volts D. C. shunt wound or 2200 volts, 3 phase, 60 cycles, slip ring, A. C. type. It must be in perfect operating condition.

State best price and delivery.

Monongahela Power and Railway Co.
Parkersburg, W. Va.

For 20 Years

we have been
Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

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1—2200 KW. Westinghouse 6 phase, 60 cycle, A.C., 600 volt D.C. with speed limit and end play device, speed 450 R.P.M. and 3-900 KVA. 13200/6600-368 volt transformers and panels complete.

1—1000 KW. Westinghouse 6 phase, 60 cycle A.C. 600 volt D.C. speed 900 RPM. complete with 1000 KW. 3 phase, 60,000 volt transformer with 5 and 10 per cent taps, also A.C. and D.C. switchboard panels.

2—300 KW. Stanley 3 phase, 25 cycle, 360 volts A.C., 600 volt D.C. speed 500 RPM. complete with suitable transformers, also panels.

DIRECT CONNECTED ENGINE UNIT

1—850 KW. Gen. Elec. 575 volt compound wound 100 RPM. generator direct connected to 23 and 54 x 48 Greene Wheelock cross compound heavy duty 4 valve engine complete with Surface Condensing equipment and panel, price f.o.b. cars..$9,500

Archer & Baldwin, Inc., 114 Liberty St., New York City
Telephone: 4337-4338 Rector

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"Searchlight"

Try an ad for what you wish to sell.

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700 tons new 9 in.

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Penna. Steel Co. Section 228, 107 lb. to the yard. Attractive price upon application. Subject to R. W. Hunt & Company's Inspection. Prompt shipment.

H. M. FOSTER COMPANY
Continental Building, Baltimore, Md.

WANTED—TO BUY

Eight (8) Fare Boxes

State price, years used, date last used, and give description.

PARIS TRANSIT CO.
Paris, Texas.

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

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Ingersoll-Rand Co.
Air Compressors
Ingersoll-Rand Co.
Air Motors
Ingersoll-Rand Co.
Air Receivers
Ingersoll-Rand Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Angle Bars
Ingersoll-Rand Co.
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Railway Improvement Co.
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Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ord. Co.
St. Louis Car Co.
Axle Straighteners
Columbia M. W. & M. I. Co.
Axles, Car Wheels
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.
Babbitt Metal
Ajax Metal Co.
More-Jones B. & M. Co.
Babbitting Devices
Columbia M. W. & M. I. Co.
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Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.*
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Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Stucki Co., A.
Bells and Gongs
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Columbia M. W. & M. I. Co.
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Niles-Bement-Pond Co.
Boilers
Babcock & Wilcox Co.
Boiler Tubes
Cambria Steel Co.
Midvale Steel & Ord. Co.
Bond Testers
Amer. Steel & Wire Co.
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Bonding Apparatus
Amer. Steel & Wire Co.
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Bonds, Rail
Amer. Steel & Wire Co.
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Niles-Bement-Pond Co.
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Electric Ry. Equipment Co.
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Brake Adjusters
Gould Coupler Co.
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National Ry. Appliance Co.
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Brake Regulator
Hamilton & Hansell, Inc.
Brake Shoes
Amer. Br. Shoe & Fdy. Co.
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Weierbach Brake Shoe Co.
Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
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National Brake Co.
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Electric Equipment Co.
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Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Br. & Metal Co.
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Commutator Truing Devices
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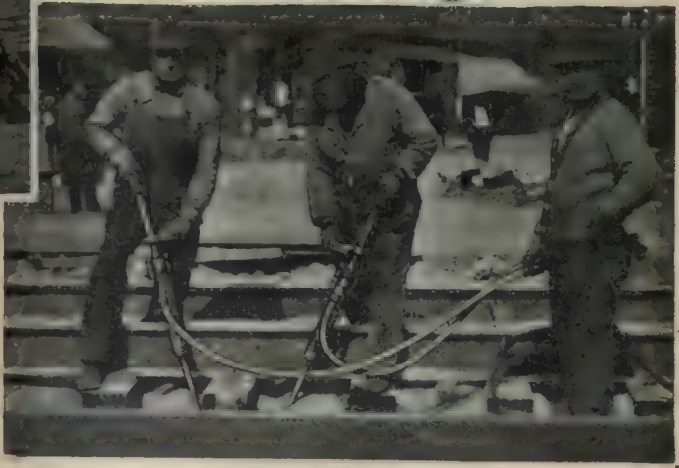

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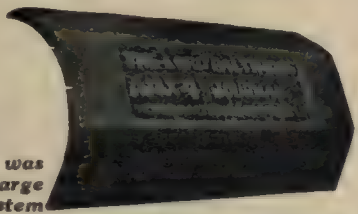

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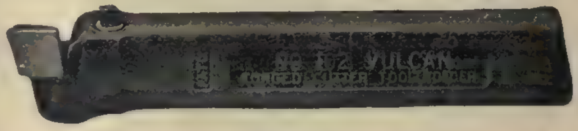

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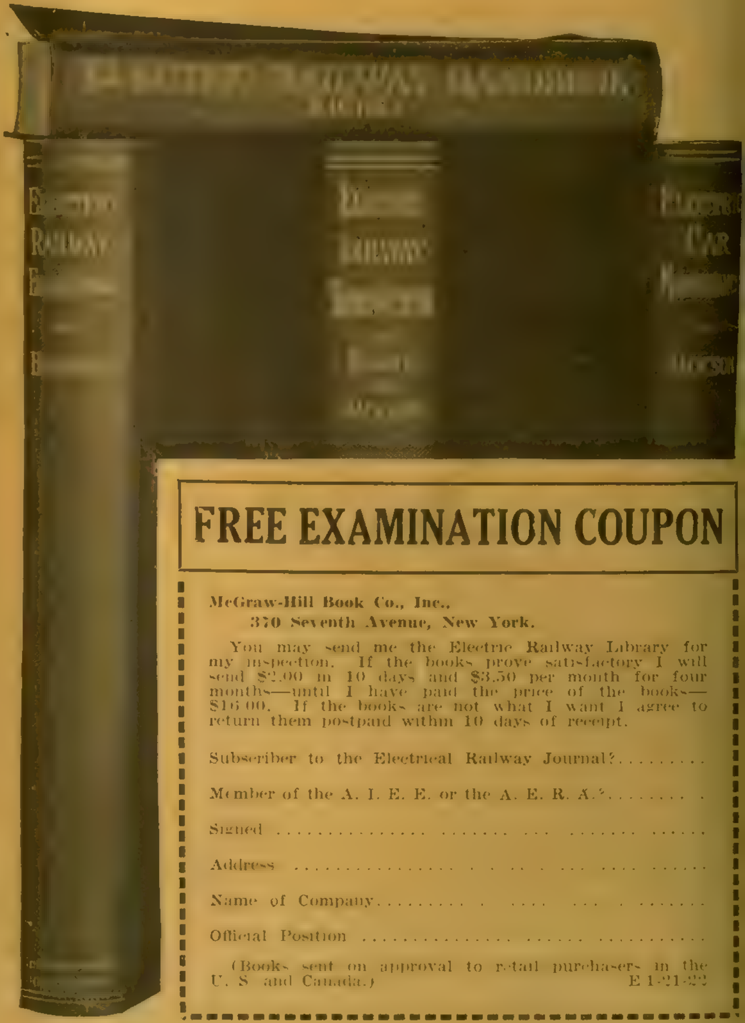

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Vol. 59, No. 4 New York, January 28, 1922 ***Pages* 141-178**

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors **Henry H. Norris, Managing Editor**

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ONE day last week, during the annual meeting of the American Society of Civil Engineers, some six hundred or more members of that society came over to the McGraw-Hill Building to see at first-hand something of the manner of making a technical paper. Of course, what they saw were the editorial, business and circulation offices of eleven of the McGraw-Hill publications and the plant where the magazines are actually manufactured.

It was a hurried survey at best, this covering of the seven floors of the thirteen-story building where this work is done. It was, however, enough to excite real interest among the visitors and to give them an impression of what it means, as a manufacturing proposition, to produce the McGraw-Hill publications. But the fact that most of them left with queries as to more detail, as to what was behind all this—how the editorial and business departments actually work and think and lay their plans to produce a magazine—indicated an unsuspected interest by readers in the making of their magazines.

"Electric Railway Journal" would like to have its readers and customers know more about it. We want you to know how and why we do things which go to make up the "Journal." We extend an invitation to *any and all of our readers* to come and see us and let us show you the machinery of production and the organization.

As to how and why we do some of the things we do in connection with the production of the paper, we plan from time to time to tell you something in this column.

Publishing a technical business paper is a business which is exacting in its demands upon those who follow it, yet is of absorbing interest to most of those engaged in it. Some who read the paper call editors "reporters." We hope, when you have a more intimate knowledge of our purposes and ways, that you will understand our desire to be of tangible constructive service to the industry, as well.

And, after all, come and see us.

Circulation of this Issue, 6,000.

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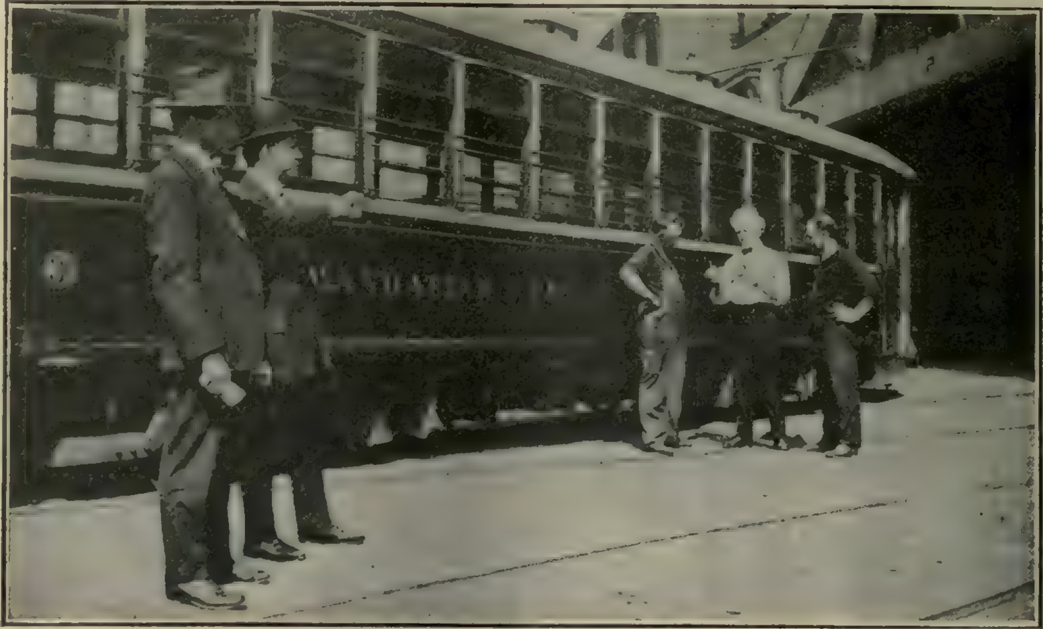

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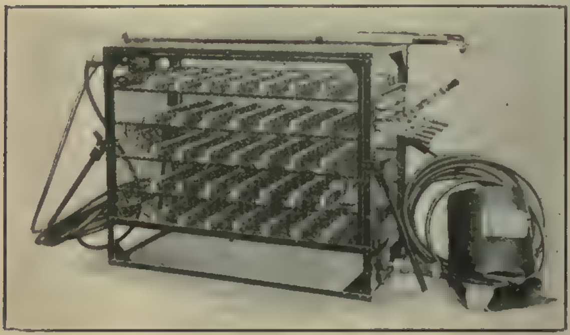

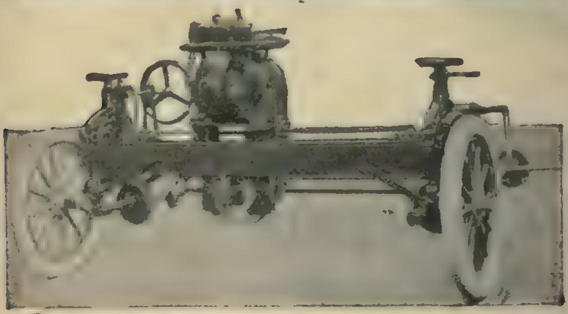

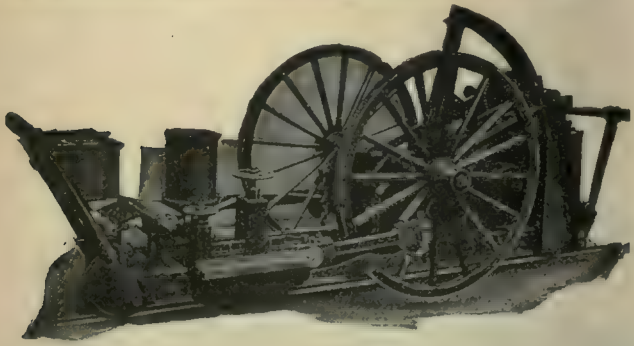

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who sells after the sale has been made

Suggested by a text in Frank H. Warren's paper on "How Can Salesmanship Be Applied in the Street Railway Business?"

Dandy paper—look it up please in the Dec. 3, 1921 issue.

He says: "Now practically what can the conductor or motorman do to sell rides? . . . . His first point of contact with the customer is after the latter has been sold." . . . .

Right-o!

The platform man isn't a salesman in the usual understanding of the word, but he surely has a lot to do in *keeping* the customer sold. How?

Because, through rendering unto Power the things that are Power's, the operator has the time to give courtesy and care to his customer. *He* gives the *personal* service required, while the quick yet gentle closing of the doors, the folding of the steps, and the prompt yet safer starting of the car is carried out by the proper combination of these *mechanical* services.

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The Outlook for the Electric Railway Industry

BY JAMES P. BARNES

President Louisville Railway

THE utilities—by their service ye shall know them, and beyond doubt as they serve they shall be rewarded, and, as they fail to serve, condemned.

A new spirit is abroad—born of the world throes of warfare, and today the true measure of service is the Golden Rule. The service is the thing and we must seek, not so intently remuneration for, but opportunity to serve. This is not to intimate that we can serve at unremunerative rates, but rather that if we ask and grasp our opportunities for service of the broadest kind, remuneration will follow as a matter of course.

Well and comfortably to transport from home to factory, store and office an urban population is no small service to a community, but it is not the only opportunity for service. The shopper, the theatergoer, the pleasure seeker have each their claim upon the transportation service, and upon these elements, together with the units which go to make up the peak requirements of a system, will the base and rush-hour schedules be built. The obligations of courtesy and convenience in service are too well accepted to require comment.

THE BUGBEAR OF TRAFFIC CONGESTION

But is this all the city railway can do for its patrons? Is there no element of service as yet undemanded because unforeseen? Is there no means by which the plant may be made more widely useful to the community and its burdens—thus incidentally distributed over a wider field of uses?

I think there is, and that the way to solution of the problem lies in the study of what is today the most troublesome of every city's problems, and which, so far from being met, is actually daily becoming more aggravated. I refer to traffic congestion.

The downtown city streets of today are no more adequate for the requirements they are called upon to meet than were the cowpaths of Colonial days adequate to become the downtown streets of New York and Boston. Relief is imperatively demanded, but by what means?

Widening of thoroughfares is impracticable because of the enormous expense involved. Yet what else will suffice?

For the sake of the practical let us for the moment be visionary. Suppose the sidewalks where now inadequate were to be widened by extension into the street, and the street to be at the same time widened by the elimination of the long line of parked vehicles which is a daily sight in every city. In every city a judicious elimination of vehicle parking would leave a maximum walk of say three blocks to any store or office building. How much real hardship would this entail to the average shopper?

The real congestion of our streets arises not from the commercial delivery vehicle so much as from the private conveyance. But is there not a way by which we of the electric railways might assist even in the elimination of the commercial vehicle from street parking?

Surely it is false economy from the viewpoint of a community that delivery facilities for its merchandise distribution be needlessly extended and reduplicated. Why should not all merchandise, with a possible few exceptions, be delivered from one vehicle? Mass distribution from business or shopping center to outlying substations and thence door delivery by suitable vehicles would have alike the streets, the machinery wear and tear and the temper of the housewife, who would receive at one delivery all the merchandising that now requires many answers to the doorbell. Visionary? Perhaps, but there is a service which the city railway with its tracks laid and its cheapest per ton-mile facilities at hand could render to the profit of itself and the economy of the community.

The future of the electric railway industry is vast and opens before us like a fairland of opportunity. New means of transportation are within our grasp as feeders and auxiliaries. The auto truck, the auto bus and the trolley bus are all tools to our hands. Dream, visualize, anticipate and fearlessly adopt the worth-while innovations, and the future of the industry is vast indeed!

Abstract of paper presented at meeting of Kentucky Association of Public Utilities held at Louisville, Ky., Nov. 22, 1921. Reprinted from *Electric Railway Journal*, Tenth Ave. at 36th Street, New York City.

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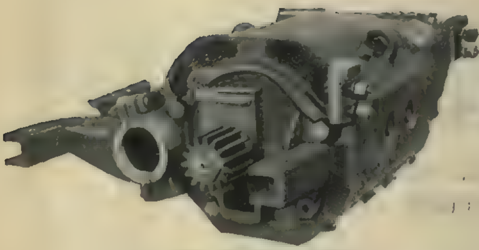

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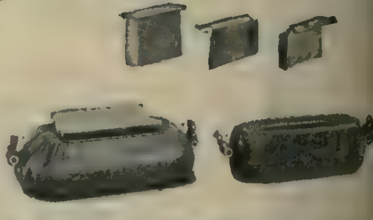

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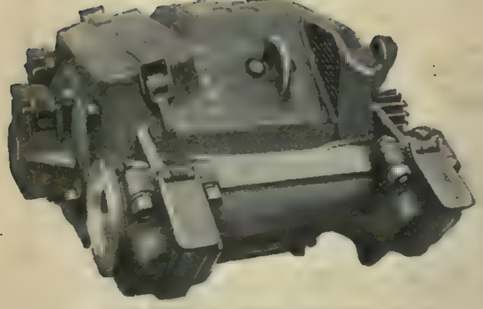

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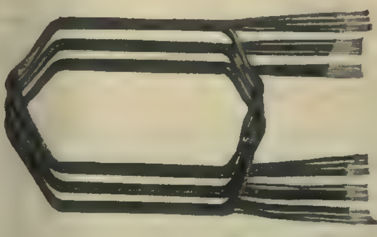

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Volume 59 New York, Saturday, January 28, 1922 *Number* 4

What Forces Are Potent in Shaping Railroad Electrification Progress?

THE valuable paper on heavy electric traction in America, prepared by George Gibbs for the ninth congress of the International Railway Association, occupies eighty-four pages in the December, 1921, Bulletin of this association. It contains a wealth of timely data and should be studied carefully by all who wish to be informed on the subject. As is expected in a paper of this kind, Mr. Gibbs also expresses his opinion as to the future of heavy electric traction and as to the relative merits of competing designs of locomotive drives, motors, working conductors, etc. He concludes that, except for the recent setback incident to the war, electrification plans are proceeding normally. He concludes also that high voltage, with overhead contact, is essential in heavy traction, and he leans toward alternating current as superior to direct current, while keeping a mind open as to the possibility of the development of superiority in systems other than that which now seems to him to be best.

Mr. Gibbs expresses concern as to possible interference with the orderly progress of electrification by the operation of influences from outside the steam railroad field which are making themselves felt in this movement. He has in mind the danger that power, telephone, telegraph and manufacturing interests may unduly urge their ideas on the railroads, influencing the latter to adopt what may not be in their best interest. This point raised by Mr. Gibbs merits consideration and might as well be discussed fully and frankly at this time by all concerned. Some pertinent questions are these: Are these outside interests, as well as the general public, entitled to "butt in" on this matter at all? If they are, what form should their contentions take? Is there any way by which harmony, if not unanimity, of opinion may be insured? Here are a few thoughts by way of answer:

Railroad transportation is so fundamental a necessity that every person in the country is involved in its success. The cost of living and doing business is so dependent on it that if anything can be done to reduce the cost the people are for doing it, especially if their own comfort, safety and convenience are served at the same time. The railroads, also, are using up the country's fuel at such a rate as to alarm every one who is mentally responsive to data. Public sentiment is therefore going to have a powerful influence on the thinking of executives, because the public and the railroads are essentially one. The widespread and increasing popular and railroad interest in electrification indicates the trend of the times.

Again, assuming a reasonably prompt response to economic and popular demands on the part of railroad executives, it will be necessary for manufacturers of electrical equipment to be ready to supply such equipment, as the requirements arise, with celerity and certainty of satisfactory performance. They must therefore be alert and aggressive early in the game. Their side of the problem should be viewed sympathetically, in spite of the fact that they, like the railroads, are in business for profit. They cannot furnish what the railroads need, and so make the railroads more profitable, without co-operation.

As to the power supply companies, they will be expected to furnish cheap and reliable power for railroad operation. Hence they must be ready to do this, but they cannot do it without the help of the railroads. And the telephone and telegraph companies, of course, are on the lookout so that their circuits will not be interfered with unduly as the railroads take more and more electric power.

All of this points to the need for the various, and in a way conflicting, interests to get together, preferably under the auspices of the steam railroad organizations; another illustration of the good that could be done by an "American Committee on Electrification." This paper has already urged that the associations concerned get together to form such a committee.

The railroads of the country are so vast a proposition that it is not to be expected that so radical an innovation as electrification can be introduced wholesale. It will take a long time and much money to apply electric motive power even in those sections of railroads which logic and economics indicate to be ripe for electrification now. Progress should not be too fast; as Mr. Gibbs suggests, the "state of the art" does not warrant undue haste. All that can be done now is to prevent waste and lost motion in the operation of the powerful forces within and without the railroad organizations which are acting to bring electrification about.

Car Design Is Still in a Formative State

THE use of turnstiles on one-man cars in Syracuse and Utica, where seventy-five of these cars are in use, emphasizes the fact that car design is still in very much of a formative state. At several times since street cars have been in use it has been thought that car design was pretty well standardized. Then some radical improvement has thrown the whole subject open again. One instance, of course, was when the pay-as-you-enter principle was generally adopted some twelve years ago. After car design became standardized fairly well for this system of fare collection the adoption of pay-as-you-leave in many cities again upset previous standards. Then came the one-man idea to destroy other traditions.

The idea of using a turnstile on a car is not, of itself, an entirely new idea, though formerly the idea was to use it for registering the passengers as they entered a pay-as-you-enter car. In this case, however, the turnstile would have to be in a part of the car where room is very valuable. With pay-as-you-leave by the front platform, however, on a rebuilt double-end car, the rear platform can be used for a turnstile without loss of much valuable space, and in Syracuse and Utica it has been found that the same is true also if the turnstile is placed at the center door of a Peter Witt car.

Mr. Sweet's paper does not describe what will necessarily be a permanent feature of future double-truck one-man cars. It is an effort, like the other variations of the original one-man car design, toward improvement along certain lines. This desire for change is not an indication that the original one-man car design was defective. Rather, it proves that the one-man principle, as developed in Fort Worth and elsewhere, was so great a success that its field of application far exceeded the expectations of at least most of those who recognized its good features from the first. From the idea that it is applicable only to comparatively scant traffic and to a small car, it has been found that the principle is adapted to heavy traffic and large cars, so that it is not surprising that modifications should have been made in the original design. In fact, the greatest developments of the immediate future seem to be along the line of double-truck one-man cars and how best to secure passenger interchange in the minimum time.

It may be said that one-man car design is now centering around three different types of cars. One of these is the original Birney type. The second is the longer car with nine windows and either single or double trucks, with separate entrances and exits, either together, as in Baltimore or Chicago, or separated, as in the Syracuse and Utica cars. The third type is the still longer car having, say, ten to twelve windows and capable of operation by one man during light hours of traffic, but fitted so that it can be used also for two-man operation. Such a car could perhaps also carry multiple-unit equipment.

"Said the Next Mayor of Boston to the Mayor of New York—"

"I wish for the Mayor and his associates a most successful administration, and I trust it will be my opportunity and privilege to come here from time to time to secure direction and advice and help in the matter of the government of our smaller city from the government of the foremost city in the entire world." . . . *Excerpt from the speech of Mayor-elect James M. Curley of Boston at a recent meeting in New York, where Mayor Hylan and his associates were discussing transit matters.*

PRESUMABLY the Mayor-elect of Boston dropped in at this meeting of the New York Board of Estimate to get a few pointers on how to handle unruly traction magnates, and how to secure and preserve the sacred 5-cent fare for the people. In New York one still enjoys the privilege of paying the good old-fashioned nickel fare, but the degree of one's enjoyment is somewhat tempered when one finds that the privilege is repeated about every time one changes cars. For receivers and courts, with supreme indifference to the political speeches of Mayors and others, have turned back leased lines to original owners, and told them to go ahead and operate them on their own hook, and make a profit if they can, on a 5-cent fare. The result is that the free transfer is practically extinct in New York.

In Boston, on the contrary, where the people are mulcted (to use a word popular with our best politicians) 10 cents for a ride on the traction lines, they at least have the more substantial privilege of completing their ride to any part of the system in the metropolitan district for the one fare. And approximately 20 per cent of all the riders are getting the benefit of the local 5-cent fare for short rides in suburban districts.

But genial "Jim" Curley feels that the people are paying too much. At any rate, that is what he endeavored to make them believe in his recent whirlwind campaign which landed him the mayoralty of Boston against the opposition of practically all the newspapers and a combination of the Boston Republicans with most of the strongest Democrats in that stronghold of New England.

If Mr. Curley thinks he is going to improve the transit situation in Boston by getting it into anything like the present condition of New York's, then the car riders of Boston will soon be deserving of all the sympathy they can get.

Of course a 10-cent fare does look big! It probably seems like quite a hardship to some of the regular patrons among the working people who must ride two or more times daily. However, under the management of the present trustees, assisted by the executive officials of the Boston Elevated Railway, the Boston public is now receiving a high grade of service. Whoever is interested enough to take the trouble to investigate need have no difficulty in assuring himself that the revenues received from the riders are all being spent for the ultimate good of the car rider himself. Several millions of dollars annually are being spent for extraordinary maintenance and rehabilitation. Miles and miles of track have been rebuilt. Ancient cars have been scrapped literally by the hundred, and modern equipment has been substituted. The great system, which was starved to the very verge of dissolution on the old 5-cent fare, is being revitalized and placed in a condition to give the community the kind and degree of service which every large urban center should possess for its own welfare. Recent financial reports indicate that a substantial surplus is being earned, which it is said will be applied to repaying to the Commonwealth of Massachusetts, and the city of Boston and surrounding towns, the sums raised by taxation to support the road during the first year or two of trustee management before the property could be got on a self-supporting basis. Now it is self-supporting, while in New York, at least on the rapid transit system, taxes are higher in order to carry passengers at less than cost.

When the tax rate in Boston begins to show concrete evidence of abatement, as the result of the present methods of management of the Boston traction lines, it is not unlikely that the enthusiastic disciple of Hylan methods may find some lack of support among the followers if he tries to tear down the constructive program now in progress. The local 5-cent fare scheme has made a lot of friends in the short time it has been in effect, and the prospect of a reduction in the basic 10-cent rate seems not so remote but that it may occur to steal still further some of Mayor Curley's favorite thunder.

In view of recent developments, it would seem desirable for the railway interests in other communities where political hostility exists to make a pretty thorough study of the New York situation and the facts which are being brought to light by the various investigators. They might well undertake a little campaign of education to show their own political friends as well as enemies wherein they may be better off after all than the "foremost city in the entire world" in spite of its heralded adherence to the 5-cent fare.

VIEW IN MOTORMEN'S SCHOOL IN BERLIN
At left, explaining the mechanical details of the car. At right, a lesson in controller connections

Psychological Tests for Motormen

Candidates for the Position of Motorman in Berlin Have to Pass a Series of Physical and Psychological Tests Before Being Accepted—Important Savings Are Effected by Engaging Only Those Men Who Have Been Shown by These Tests to Be Well Suited to the Work

BY DR. ALFRED GRADENWITZ
Berlin, Germany

THERE is a growing tendency in Germany at present to increase the efficiency of workers in all walks of life by submitting every candidate for a profession or calling to elaborate psychological tests. This movement is especially marked in the case of lines of work such as airplane pilot, locomotive engineer, automobile driver and street-car motorman where property and human lives are jeopardized by unskillful operators.

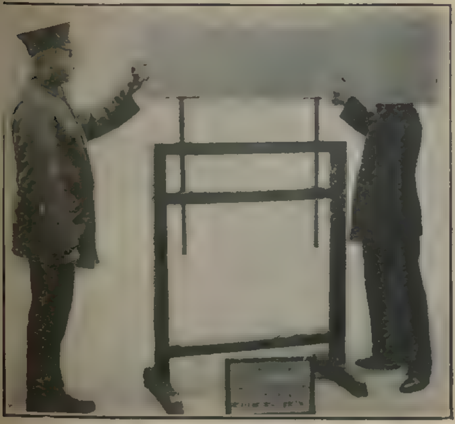
The engineer-manager of the Berlin Street Railway, K. A. Tramm, has installed at the Lichtenberg depot a testing laboratory where all applicants for the position of motorman, previous to their entering the training school, undergo an exhaustive series of psychological tests. The apparatus used in these tests is exceedingly ingenious and was designed by Mr. Tramm.

Obviously, one of the first requisites for the position

AT LEFT, TESTING FOR SIGHT
The candidate receives cast-iron letters and is asked to hold them in the same position as they appear on a board at some distance.

AT RIGHT, TESTING FOR COLOR BLINDNESS
This is done by a plate on which colored figures appear on different colored backgrounds.

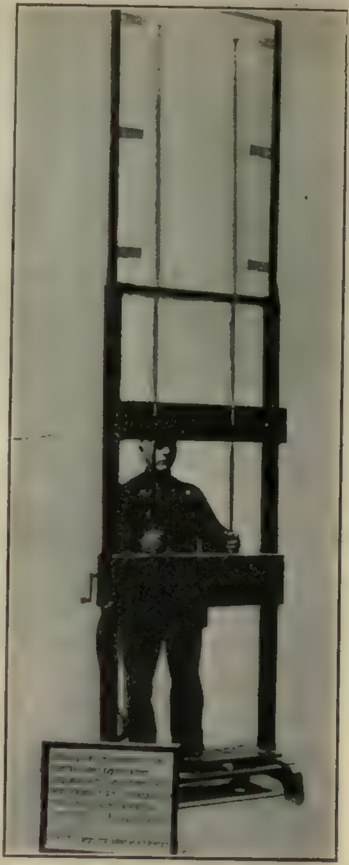
THREE LOWER VIEWS
In the first test the candidate's ability to discern objects inside a case covering his head is ascertained. In the second test he has to hold two rods steady in slots in a metal plate; if not, a bell rings. The third test is somewhat similar to the second, except that disks fitted with handles to represent the controller and brake handles have to be turned steadily without being allowed to touch an outside plate.



TESTING THE CANDIDATE WITH A HOOD FOR "NIGHT BLINDNESS"

TESTING THE STEADINESS OF THE CANDIDATE'S HANDS

TESTING FOR SKILL IN STEADILY TURNING THE CONTROLLER AND BRAKE HANDLES of motorman is a good eye and sufficiently keen sense of hearing. In order that any obstacle to traffic may be perceived in time, a sufficient concentration of attention is urgently required. To enable operations in case of danger to be carried out rapidly and properly, promptness of decision and presence of mind are required. The proper appreciation of distance, curvature and other factors of length necessitate a sense of dimensions. These facts should not only be perceived properly and promptly, but they should be permanently present in the motorman's mind so that, particularly in operating the controller and brake, he may be able beforehand to take account of local conditions of the track.

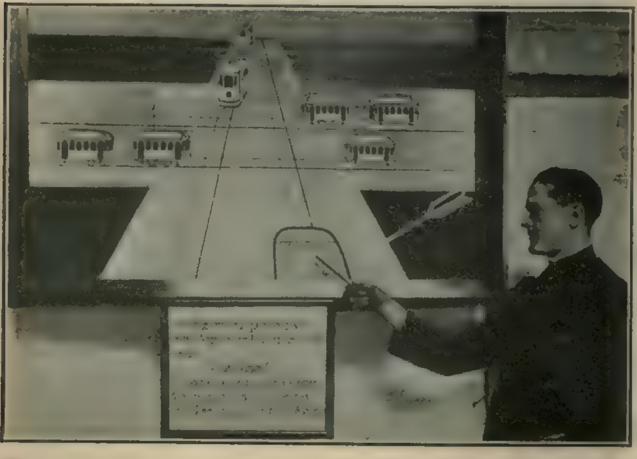


TESTING THE CANDIDATE'S PROMPTNESS OF ACTION

He must be ready to catch two vertical rods, when they begin to fall.

To understand instructions and signals requires a good memory. To gage the proper traveling conditions of a car and its acceleration in starting and retardation in braking demands good distinguishing powers for various kinds of motion. A proper operation of the controller requires a sufficiently keen sensitiveness in the joints to movements of the arm. Finally, the proper knowledge of the mechanical and electrical features of the rolling stock requires certain technical ability so that any defects in the car, especially in the case of trouble, may be recognized and remedied as promptly as possible.

All the principal qualities just mentioned should be influenced but little by the duration of the service, unfavorable atmospheric or other working conditions such as day or night service, prolonged intervals between meals, etc. In other words, the motorman should possess a considerable amount of bodily endurance and resistance, in addition to the mental and physical capacities which have already been enumerated. After this enumeration of the more important faculties required in a motorman, the methods of testing for them, as followed on the Berlin tramway system, will be described and illustrated.



TESTING MENTAL ALERTNESS AND UNDERSTANDING OF TRAFFIC RULES

On this artificial track there are suddenly lighted some of the model cars shown in the figure. The candidate then has promptly to state the car entitled to start first.

HOW THE TESTS ARE CONDUCTED

To test a candidate's visual powers, he is handed some cast-iron letters and asked to keep them in the same position as he sees them on a board installed some distance away. His ability to distinguish the various signal lights is tested by means of a plate on which colored figures are visible on a differently colored background. Color-blind persons are, of course, unable to read these figures. Finally, a good motorman should be able to find his way even in the dark. In other words, he must not be "night-blind." This question is ascertained by means of the following test: The candidate is directed to insert his head in an oblong casing closed on all sides, and after waiting for from one to two minutes, or just the time required to accommodate himself to the darkness, he is asked to state how the letters seen inside the casing are standing—upright, at an angle or upside down. A slide operated by the inspector in charge of the test at the front of the casing allows the darkness to be reduced or increased at will.

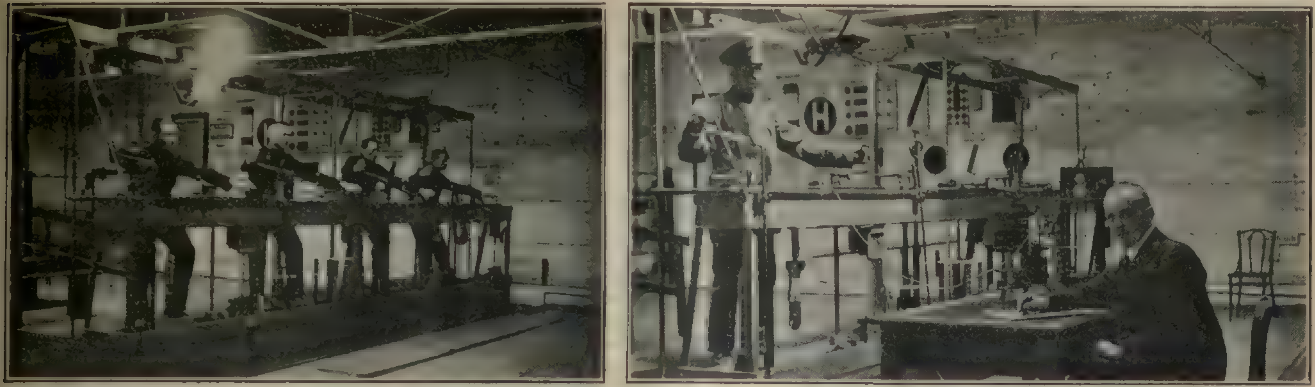
Another set of tests is intended to examine the steadiness of the hand. With one apparatus designed by Mr. Tramm, the would-be motorman is asked to seize the handles of two vertical rods which fit with a certain amount of play into slots in a metal plate. As long as he keeps his hands quiet, the circuit of an electric bell is interrupted. As soon, however, as his hands begin to tremble ever so little, these rods will touch the edges of the slots, thus actuating the bell, and the candidate must try to keep the rods quiet so as again to silence it.

A test with one crank, designed like a controller crank, and another like a brake lever, both connected so that independently they turn a disk, belongs to the same group. The would-be motorman is asked to turn the disk by one crank and then by the other into the various traveling positions, without touching the edges of the slot. Whenever he fails to comply with this request, an electric bell is sounded. The candidate at the left in the illustration showing this test is holding a weight which he is obliged to raise ten times with each hand.

TESTS FOR PRESENCE OF MIND

The tests which are intended to determine the presence of mind and promptness of decision of the applicant are likewise considered to be of the highest importance. An apparatus consisting mainly of two vertical rods is alike practical and ingenious. After placing himself in front of these rods, the candidate must put his hands around them without, however, actually touching them. Then, while he is looking at the objects in front of him, he must try, as soon as the rods start falling, to seize hold of and stop them. The farther down the rods are allowed to fall before the man succeeds in catching hold of them, the less may his promptness of decision be relied upon and the more unsatisfactory will be the result of the test.

Inasmuch as a skillful motorman should know at once whether his car at a track crossing may start in advance of others, Mr. Tramm designed a board on which a number of pictures of street cars are mounted and can be set so as to occupy various positions with regard to



TESTING THE "NERVE" AND PRESENCE OF MIND OF WOULD-BE MOTORMEN

At left, the candidates are frightened by heavy electrical discharges and their behavior in the event of an accident is thus tested. At right, the man at the controller handle is suddenly to be startled in some way and his action observed. Mr. Tramm, who has charge of these tests, is seen at the table in the foreground.

one another. When the instructor actuates an electric switch, these cars can be lighted up in any desired combination. The candidate then should immediately state the number of the car entitled to start in advance, according to the traffic rules in force.

It is, of course, of the highest importance to ascertain how a candidate will behave in the event of a danger, whether he will lose his wits to the extent of letting go the controller handle and brake and passively stand by, or whether he will promptly take any measures required for the safety of his car and passengers. To determine this, the man is placed before a controller handle, and while he is practicing with it he is frightened by a sudden report, a short-circuit flash passing before his eyes or the floor yielding below his feet. If he loses his presence of mind in these circumstances, the company knows that he should not be intrusted with the care of a car. If, on the other hand, he promptly performs such manipulations as were recommended to him in the event of anything unforeseen happening before his eyes, he is considered to possess the presence of mind required for his responsible profession.

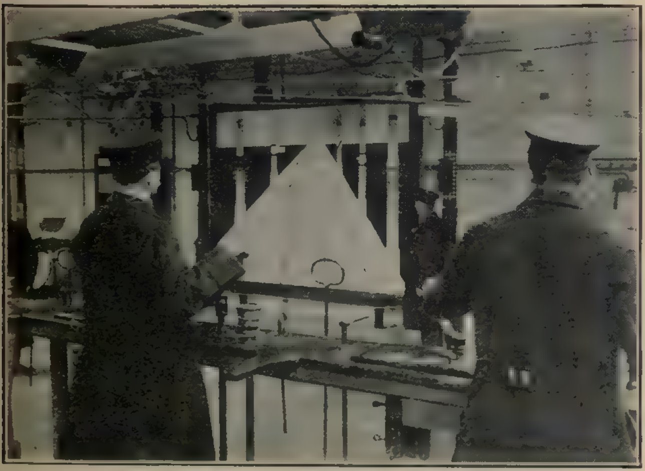
Two illustrations show this test. In one a fuse is glowing over the heads of three neophyte motormen. In the other, the candidate is standing at a controller ready for some test of his nerves, yet to be applied. Mr. Tramm is seated at a table in front of him, ready to record the results.

Another test of cool-bloodedness or "nerve" is provided by another board painted to represent a miniature track. Electrically lighted obstacles suddenly appear on the track, and the presence of mind of the prospective motorman is gaged by the rapidity with which he turns his dummy controller handle to the off position and applies the brakes.

Finally, tests of intelligence are made to ascertain the professional fitness of the would-be motorman. To make sure that he is capable of understanding certain technical facts, he examines under an instructor drawings of the machinery on a car illustrating the motor suspension with gearing, and is asked in which direction the car will travel in case the pinion and then the gear rotates in a given direction, whether the pinion or the gear has the greater number of revolutions per minute, in which direction the brake lever should be moved to stop the car, etc.

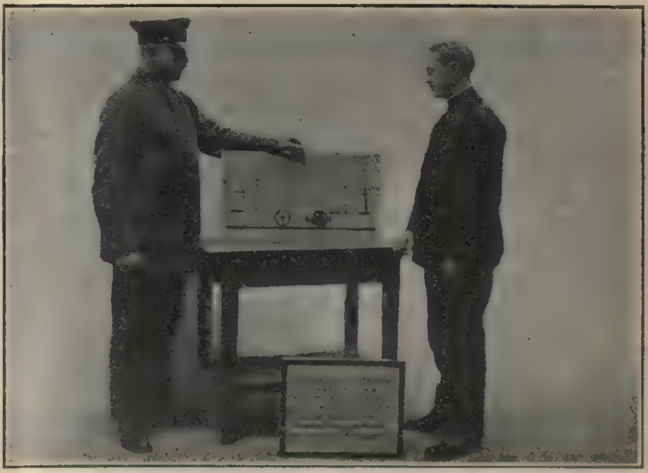
PSYCHOLOGICAL TESTS FOR CONDUCTORS

A similar testing laboratory is now being installed for would-be conductors. The management proposes in this laboratory, by means of specially designed apparatus, to test applicants for the position of conductor as to their memory of persons and streets, their ability simultaneously to give close attention to different events, the acuteness of their touch in judging the fineness of different thicknesses of paper, etc. Especial importance is attached to their rapidity of per-



TESTING PRESENCE OF MIND

This board represents a track on which electrically lighted obstacles suddenly appear. The candidate for motorman is at a dummy controller stand, and the rapidity with which he acts determines the degree of his mind.



TESTING THE MAN'S SENSE OF MECHANICS

He has to answer such questions as: "In which direction does the car go when the yellow wheel or pinion is turning in the direction of the arrow?" "In which direction should the brake handle be moved to brake the car?"

ception, on which their skill in distinguishing coins depends. This is tested by allowing the shutter covering a hole in a black board to be open during a fraction of a second and asking him how many black points were to be seen through the aperture.

ADVANTAGES CLAIMED FOR THE TESTS

Mr. Tramm claims the following advantages for the series of tests devised and adopted by himself:

1. An increase in the safety of service;
2. A reduction in working expenses;
3. Avoidance of employment of persons unfit for the service and therefore either inefficient or actually dangerous;
4. Avoidance of any unnecessary loss of time in instructing persons unfit for the position of motorman;
5. A fair determination of the faculties of every candidate;
6. A possibility of producing conclusive evidence of care in selection of men in the case of negligence damage suits.

Two views are given at the head of this article of the Berlin school for motormen. All of the men shown in these views as engaged in learning about the equipment of a car have passed the tests for applicants for the position of motorman, already mentioned.

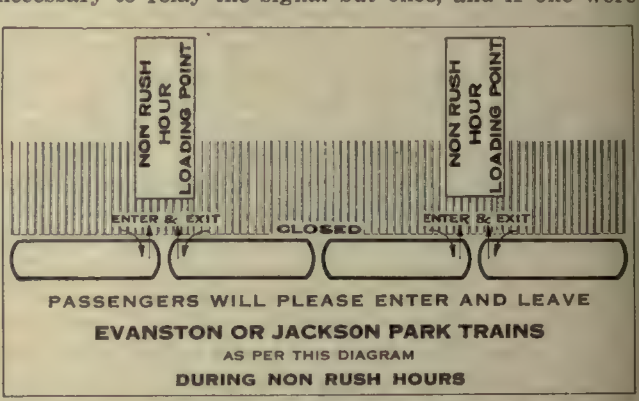
One Guard Omitted in Non-Rush

Chicago Elevated Railways Makes Saving by Operating Four-Car Train with but Two Guards—Public Was Fully Informed in Advance

ON OCT. 18 the Chicago Elevated Railways began operating four-car trains on the Evanston-Jackson Park line with only two guards between the hours of 9 a.m. and 4:30 p.m., two hours in the evening, and all day Sunday. Thus one guard is eliminated for each four-car train in service during these periods. While this economy measure was considered by some to be a radical step, B. J Fallon, general manager, stated on Nov. 11 that up to that time the company had received two letters and four telephone calls as the total public comment on the matter. This may be partly accounted for by the complete plans laid by the company to inform the people in advance of the change as to how they should enter and leave trains. On every platform two signs were erected and designated as Stop 1 and Stop 2 for use during non-rush hours. These indicated where passengers should stand to board the cars. As the two guards employed are used between the first two and between the last two cars, these stop signs were spaced two car lengths apart and trains are brought to a stop so that the entrances where the guards are located are opposite these signs. Passengers who fail to read these signs and endeavor to board the rear end of the second car or forward end of the third car are informed by a poster on the car door that they should go to the opposite end of the car. Similarly, a poster inside on the bulkhead at the rear of the second car and forward end of the third car notifies passengers that they must go to the opposite end to leave the car. The doors between the two center cars in the train are locked to avoid the possibility of passengers attempting to pass between cars while moving, which might be dangerous if the train happened to be on a curve and there were no guards there.

In studying out the possibility of thus eliminating one guard, the feasibility of the plan was reasoned out this way: The experience in the operation of the elevated trains in Chicago is that the first and last cars of all trains are always the heaviest loaded. This is because but one door of each of these cars is used and hence they are warmer in winter than those cars which have doors open at both ends at the stops. In summer the end cars are cooler and hence attract the passengers. Since these cars are loaded heaviest, and have only one door in use, they control the time of stop. Consequently, it was felt that the length of stop of the train would not be increased by using but one door on all cars. Closing up one door on all cars makes them all equally comfortable in winter. Two-car trains are always operated with but one guard and hence but one door per car is used, and so it was deemed feasible to couple two two-car trains together in the same manner.

The bell cord between the two center cars is connected together so that the rear guard can pass the signal through two cars to the forward guard. Incidentally, with the elimination of the one guard, it is necessary to relay the signal but once, and if one were to figure close, it might be possible that the elimination of one passing of the signal might save a slight amount of time on the length of stop.


NON RUSH HOUR LOADING POINT
NON RUSH HOUR LOADING POINT
ENTER & EXIT
CLOSED
ENTER & EXIT
PASSENGERS WILL PLEASE ENTER AND LEAVE
EVANSTON OR JACKSON PARK TRAINS
AS PER THIS DIAGRAM
DURING NON RUSH HOURS

DRAWING HANDED TO ELEVATED PATRONS TO EXPLAIN METHOD OF BOARDING TRAINS DURING NON-RUSH HOURS

When the scheme was first put into effect special employees were stationed on every platform and on each train for two days to carefully watch how the scheme worked out, to note the attitude of the public and to report in detail their findings to the general manager. The card reproduced herewith was passed out to every passenger for two days and this undoubtedly also aided in avoiding confusion. The scheme went into effect without any difficulty and is considered a success.

Changes in the Cost of Living Since 1914

INFORMATION in the form of a report on changes in the cost of living in the United States has been made public by the National Industrial Conference Board of New York. This report, entitled "Changes in the Cost of Living: July, 1914–November, 1921," is the eleventh in the board's studies of the cost of living.

The total increase in the cost of living from the beginning of the war to November, 1921, the investigation shows, was 63 per cent. The rise in cost of the major items in the wage earner's family budget during this period is estimated to have been as follows: Food, 52 per cent; shelter, 69 per cent; clothing, 61 per cent; fuel and light, 79 per cent; sundries, 78 per cent.

The report shows that the peak of the cost of living in the United States was reached in July, 1920. Since then, the total cost of living has decreased 20.3 per cent. Food has decreased 31 per cent; clothing, 39 per cent; and sundries, 4 per cent; while shelter has increased 7 per cent, and fuel and light 8 per cent.

Electric Traction on Heavy Traffic Lines

Railroad Electrification in America Is Covered in a Paper Prepared for the Ninth International Railway Congress by George Gibbs—He Says It Is Too Early to Standardize, but Believes that Alternating Current Equipment Is More Promising than Others in This Field

IN HIS report on heavy electric traction in America, prepared for the ninth congress of the International Railway Association, George Gibbs, consulting engineer, Pennsylvania Railroad, summarizes the situation and gives his opinion as to the present status and future prospects of heavy traction on this continent.* The following abstract brings out some of the high points of his paper:

The past six years have witnessed a condition of arrested development in electric traction, although between 1910 and 1920 the following increases occurred: In aggregate mileage equipped, from 411 to 1,527 of route, and from 873 to 3,370 of track; in number of electric locomotives, from 136 to 371, and in number of motor cars, from 613 to 1,508.

The working conductor, by means of which power is made available at the moving train, is perhaps the most important feature of an electric traction installation. Two kinds of working conductor are in use, the third rail, which is the type first used successfully for heavy traction, and the overhead working conductor, which promises to become standard for heavy electric traction. The advantages and disadvantages of each of these are given in Table I.

WHY OVERHEAD WORKING CONDUCTOR IS PREFERRED

On account of the objectionable features listed in Table I, third-rail traction may be considered obsolete in America for heavy railway electrification. The important features aimed at in the design of overhead working conductors are sparkless current collection, strength, durability and cheapness; also, it is especially important that the collector wire shall be free from hard spots at the suspension points, pulloffs, switches, etc. The device is essentially one for small currents.

At the present state of the art the 11,000-volt alternating-current system has been demonstrated to be well adapted for current collection from an overhead conductor under all conditions met with on American railways; it is reliable and economical in upkeep. The success of the 3,000-volt direct-current system, as regards current collection, seems less certain and remains to be demonstrated for some of the difficult conditions to be met.

Substations for the alternating-current system are relatively simple as they contain no moving apparatus and require only occasional inspection and attention. Direct-current systems require transformers, switching apparatus for the high-tension current rotary converting apparatus, etc. This combination is relatively costly and complicated and requires attendants at all times. It has been proposed to do away with constant attendance by installing automatic control, but it is too early yet to pass upon the results obtained by automatic substations or to assign a definite field for their use. They may be used on important traction installations on steam railways, but as an adjunct only, to assist and simplify the work of the regular attendants in emergencies.

No approximation to a standard electric locomotive design has been arrived at. The problems awaiting solution at present are mechanical rather than electrical. A suitable design for a heavy modern steam locomotive has been evolved after years of development, and it is not a simple matter to produce an equivalent combination of elements in an electric locomotive, especially for one which will equal the powerful tractive effort of a modern steam locomotive.

Table I—Advantages and Disadvantages of Third Rail and Overhead Working Conductors

THIRD RAIL

Advantages	Disadvantages
a. It permits the conduction and collection of very large volume currents.	a. It does not provide continuous contact through complicated track switches and crossings.
b. It is located conveniently for inspection, repair and replacement.	b. It obstructs the track structure and interferes to some extent with maintenance of permanent way and track. It obstructs the spaces between tracks in yards and thus menaces the safety of employees in shunting work.
	c. It cannot be entirely inclosed and involves risk of contact by employees and others, the serious consequences of which increase rapidly as the voltage in the conductor is raised.
	d. Power to the train is subject to interruption when snow or sleet collects on the conductor.

OVERHEAD WORKING CONDUCTOR

Advantages	Disadvantages
a. It provides continuous contact at the train in places of complicated track layouts.	a. It is difficult to collect large currents from it.
b. It does not interfere with the maintenance of permanent way and track, and it may be employed safely with very high voltages.	b. There is difficulty and delay in making repairs to the contact system where traffic is heavy.
c. Uninterrupted service during sleet storms is assured from it to a greater extent than is the case with third rail.	c. It is difficult to install in cases of limited clearances at bridges, tunnels, etc.

In producing the modern economy in railway operation a factor has been the increase in weight allowed on each driving axle of a locomotive, which was a necessity because the number of driving axles for steam locomotives cannot be indefinitely increased. In the opinion of many (of whom Mr. Gibbs is one) axle weight has been carried too far, track conditions considered. In adopting electric traction there is a possibility of returning to moderate wheel weights for locomotives without disturbing present operating methods; it can be done by bringing together locomotive units to make one compound structure singly controlled. This idea has not been carried into effect chiefly because the high first cost of such an electric locomotive has deterred designers from proposing it.

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*The full text of Mr. Gibbs' paper will be found in the Association's Bulletin for December, 1921. The paper contains an extended compilation of data on heavy electric traction in America.

Generally speaking, there are three different types of drive in use on American locomotives, with many different types of wheel grouping. As to the driving mechanism, the following classification applies: (1) Drive by gearing motors directly to the axles; (2) gearless drive by mounting motors on or around axles; (3) geared or gearless drive by means of cranks and rods.

Geared drive has been used extensively, especially for light work. Thus out of 390 locomotives in use on American railways 223 have some form of geared drive with or without flexible connections.

Gearless direct drive is found in two forms: (a) The New York Central type, in which the motor armature is rigidly mounted on the axle and is free to revolve between bipolar fields carried on the locomotive truck frame; (b) the quill drive, as used on the New Haven Railroad, in which the motor is mounted on a quill around the axle and is carried by the spring-supported frame of the locomotive. The first of these types has been used for high-speed passenger locomotives, with direct-current motors, on the New York Central and Milwaukee Railroads. The center of gravity of the motor masses is low, but the type is not suitable for slow-speed work because of the low output per pound weight of the motors. With the quill drive a large motor is permissible and its weight is wholly spring-supported. The center of gravity is low, but not so low as in the New York Central type.

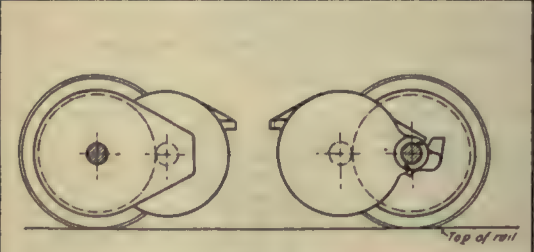


FIG. 1

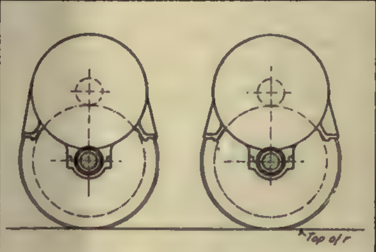


FIG. 2

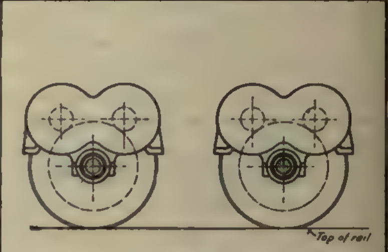


FIG. 3

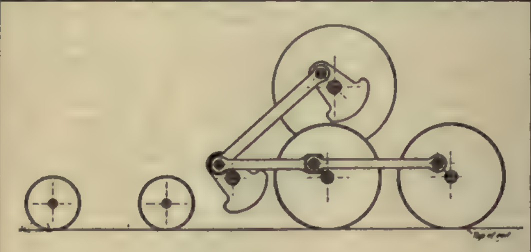


FIG. 4

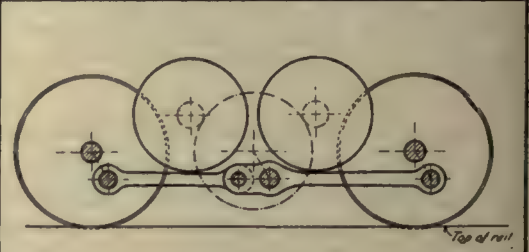


FIG. 5

Fig. 1—Direct axle-geared drive.
Fig. 2—Single motor gear and quill drive.
Fig. 3—Twin motor gear and quill drive.
Fig. 4—Rod drive with gearless motor (Pennsylvania passenger locomotives).
Fig. 5—Gear and side-rod drive (Norfolk & Western locomotives).

Several designs of geared or gearless rod drive are in use in Europe, but the type has been adopted for only two important electrifications in America. These are the Pennsylvania Railroad Terminal at New York City and the Norfolk & Western Railway electrification in the Allegheny Mountains.

The Pennsylvania locomotive has a single large motor mounted on top of the frames in the cab and connected by rods to quartered cranks on a jackshaft journaled in the frame and in the horizonal plane of the driving-rod axles. From the jackshaft, rods drive the wheels. Thirty-three of these locomotives have been in use for eleven years and have made an aggregate mileage of 11,000,000. The locomotives have shown themselves to be reliable in service and of excellent tracking qualities.

In the geared form of rod drive, as used on the Norfolk & Western, each drive element of the locomotive has two motors mounted on the truck frame. The armatures carry pinions which mesh into a gear on each end of a jackshaft, and the latter is placed between the motors with its axis in the horizontal plane of the driving-wheel axles. This jackshaft drives the wheels by means of rods and pins. A further application of this arrangement is used on a locomotive built for the projected mountain-grade electrification of the Pennsylvania.

All forms of geared-motor rod drive permit of great tractive capacity and give fairly high center of gravity, both for the heavy masses and for the locomotive as a whole.

The latest heavy high-speed passenger locomotives of the New York Central are of the gearless type, with motors mounted rigidly on the axles and with a wheel arrangement of 0-4-4 + 4-4-0. There is a single cab structure carried by center plates on an articulated subframe. The running gear consists of four bogie trucks with all axles equipped with motors. The intermediate bogies are rigid in respect to the subframes, and the forward and rear bogies swivel on the subframes. These bogies are provided at the inner end with an extended arm which couples to the frame of the middle bogies and restrains the motion of the swiveling bogies by means of an adjustable slide.

The Chicago, Milwaukee & St. Paul uses three different types of locomotives as follows: (1) The freight locomotive having a wheel arrangement of 4-4-4 + 4-4-4, with motors axle-mounted and geared, each axle being equipped with a motor. (2) A type of high-speed passenger locomotive with a wheel arrangement of 2-4-8 + 8-4-2 and with a running-gear composed of four trucks, the two end trucks having two axles and the center trucks four axles each. The trucks are coupled by ball-and-socket drawbars. Excessive lateral oscillation is restrained by an unsymmetrical mounting of the body, also by sliding side bearings. The superstructure is in three sections, the end sections containing control apparatus and providing a housing for the motorman, the central section carrying the train-heating equipment. (3) A passenger locomotive with a 4-6-2 + 2-6-4 wheel arrangement and with a single cab mounted on subframes by center and spring side bearings. The running gear consists of two frames set back to back and connected by a swiveling drawbar, each half comprising the same wheel grouping as a Pacific type steam locomotive, *i.e.*, a four-wheel guiding truck, three driving axles and a two-wheel trailing truck. The motor arrangement involves twin instead of single motors and a geared quill drive direct to the axles.

The latest heavy, high-speed passenger locomotives of the New York, New Haven & Hartford Railroad have a 2-6-2 + 2-6-2 wheel arrangement, with six twin motors geared to a quill drive. A single cab structure is carried on an articulated substructure by center plate and side friction bearers. Each unit of substructure, or truck, has three driving axles and two radial single-axle trucks. The same railroad has in service three passenger locomotives of lighter capacity, with wheel type 2-4 + 4-2. The cab is carried by two six-wheel articulated subframes. Each of these consists of two driving axles with twin motors geared to a quill drive, and one single-axle radial truck.

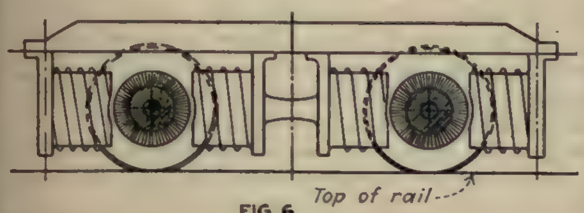


FIG. 6

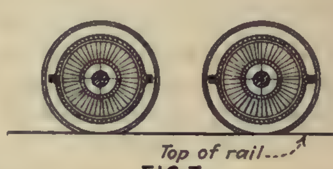


FIG. 7

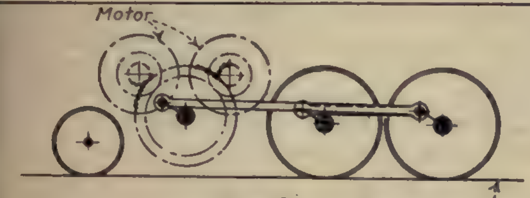


FIG. 8

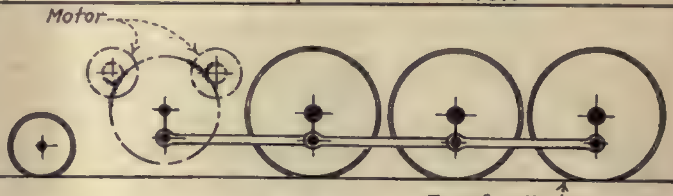


FIG. 9

Fig. 6 — Direct axle mounted armature drive.

Fig. 7—Gearless motor quill drive.

Fig. 8—Gear and side-rod (Norfolk & Western proposed freight locomotives).

Fig. 9—Gear and side-rod (Pennsylvania freight locomotives).

In 1915 the Norfolk & Western Railway placed in service twelve locomotives with a wheel arrangement of 2-4-4-2 + 2-4-4-2, which are in reality complete double-unit locomotives permanently connected by a drawbar. Each unit has a cab carried on two three-axle trucks connected at their inner ends. Each truck has two driving axles and a radial leading axle. The cab is supported on the trucks by spring cushion friction plates. No weight is carried on the center pins, which serve merely to keep the cab in its proper position on the trucks. Each driving mechanism has two induction motors geared to a jackshaft set between two pairs of driving wheels. The mechanical effort is transmitted from the jackshaft gear to the driving wheels by means of parallel rods.

For a proposed extension to service on the Norfolk & Western a more powerful locomotive has been designed but not yet contracted for. The wheel arrangement is 2-8-2 + 2-8-2, and the cab is mounted on the frame of each half-unit running gear, which consists of four driving axles in one rigid wheelbase of 16 ft. 6 in., and a radial single axle at each end. The motors are of the induction type and are placed outside instead of between the driving axles. Each pair of motors drives two pairs of wheels from one jackshaft. There is no connection between the driving couples.

The Pennsylvania has built a very powerful freight locomotive in anticipation of an extensive electrification of its main line over the Allegheny Mountains. The wheel type here is 2-6 + 6-2. Structurally the locomotive has a single cab mounted on two trucks, forming an articulated wheelbase. Each truck consists of three coupled driving axles and a forward radial single axle. Three-point suspension is secured by equalizing the driving axles, the centrally supported leading truck forming the third point. The cab is supported between the first and second pairs of driving wheels and has two side spring supports. Motors are carried outside the drivers, one pair for each truck. They are of the induction type, each pair meshing into one jackshaft gear. This gear drives the wheels by means of rods.

It is difficult to give precise indication of the probable future trend of American practice in electric locomotive design. The writer's general conclusions, however, are as follows:

The type of drive in which the motors are direct geared to the axles is suitable only for slow-speed locomotives, such as those for shunting or freight service. For the heaviest requirements of freight haulage, however, it is doubtful if this type is the best, because it is difficult to apply the drive to produce a stable wheel grouping; also because the heavy motor masses have a very low center of gravity and the weights which are not spring-borne are considerable. Large motors produce severe side shocks in curving and with track in poor surface, and hub-liner wear is apt to be great.

The quill-driven geared motors should produce better results, but only in degree. A quill drive has not been entirely satisfactory for very heavy service, because mechanically it is difficult to find space for conservatively designed springs. If the quill is not maintained normally concentric with the axle, severe bending stresses are set up in the springs at each revolution of the wheels, whereas a helical spring should be subjected to torsional stresses only.

The type of drive in which the motors are mounted rigidly on the axle requires many axles for heavy traction and a wheel arrangement which is somewhat complicated and unfavorable for tracking. It has been used for high-speed work, however, in cases where the track construction is of the heaviest character and its maintenance is of the highest order. Its field is limited to high-speed service because of the low output of the motors at low speeds.

The type of drive in which gearless motors are flexibly suspended around the axles may be used for high-speed passenger locomotives, with either alternating-current or direct-current traction, but it is not an economical type as regards first cost of motors and it has a low center of gravity of the running gear. It is, furthermore, subject to the difficulty of securing durable spring driving mechanism.

Gearless motors with rod drive are suitable for high-speed passenger work and allow the most desirable wheel arrangement and weight distribution for perfect tracking qualities of the locomotive. The motors, however, are large and costly, because of their low speed, and their capacity is limited. The type is not suitable for low-speed service.

Geared motors and rod drive offer the most flexible and promising solution for passenger and freight locomotive construction because of the allowable variation in wheel arrangement and in motor mounting and capacity. This type of drive permits perfect tracking qualities for a great variety of designs and running speeds.

Side rods connecting the various driving wheels are desirable in all types to prevent slipping of independent axles and thus to obtain maximum traction, especially with direct-current motors having series-parallel control.

A combination of driving and carrying axles is desirable, also an unsymmetrical wheel distribution, to assist in proper tracking.

FOR SUBURBAN PASSENGER SERVICE 50-TON, 70-FT. MOTOR CAR RECOMMENDED

The greater number of steam railroad electrifications involve passenger service, frequently of the short-haul, commuter variety. Considerations of obtaining adequate power to maintain exacting schedules and a reduction of idle locomotive movements have led to a desire in America to electrify all suburban services in order to permit the use of motor car trains. The maximum flexibility and relief under this kind of operation is obtained by making each car of the train a motor car, and general practice is tending toward so doing. Best economy in equipment and maintenance cost is obtained by using two motors only and mounting them on one truck.

A modern car of steel construction and about 70 ft. long over all will satisfy these conditions. It will weigh, without electrical equipment but including full passenger seated load, 50 tons. Two motors will give a capacity of about 500 hp. total for the car. With this capacity the most exacting local service schedules can be performed, if all of the cars of the train are equipped with motors.

Such services are now given with alternating current and with direct current up to 1,500 volts. Motor-car equipments for 3,000 volts, d.c., have not yet been under practical trial on any steam railroad in America.

As to trend of practice in American electrification of steam railroads, it is not possible to draw any definite conclusions, except that the field is narrowing to the use of two systems. These appear, in the present state of the art, to be best adapted for heavy and for long-distance railway operation. They are the 3,000-volt direct-current system and the 11,000-volt alternating-current system.

It is too early to fix upon a standardization to an important degree for any system, much less to exclude any promising system, for the following reasons:

1. Data are not yet available to permit a conclusion as to the relative advantages and disadvantages of alternating and direct current.

2. It is too early to determine and fix the features of any one system to the extent required for useful standardization, without restricting the future and desirable development of the system selected.

3. Neither system, as now developed and applied to a typical general case, shows an advantage in first and operating costs.

4. There is danger, in endeavoring now to arrive at one standard system, of being unduly influenced in favor of one which is now enjoying the greatest use, and which may have been the only one available at the time of installation.

It would appear that the development of electric systems is proceeding along normal and logical lines. However, there is some reason to feel that this orderly consideration of the subject may not continue, because of the views which are being expressed by those who are not engaged in operating the railways, but are connected with other industries, including manufacturing, telegraph and telephone service and power generation. While these interests have decided views and are expressing them, the railroads, which must use the apparatus, have not considered it necessary actively to advocate any particular electric system.

The writer wishes not to be understood to advocate any one system to the exclusion of another, but he considers the high-tension alternating current to have at present the greater number of demonstrated advantages for general railway use and to hold out the most promise for the future. Therefore, if it is thought necessary to standardize now, it appears illogical to select the high-voltage, direct-current system, which appears difficult of application to operating conditions.

A WORD AS TO ELECTRIFICATION ECONOMICS

As to installation and operating costs, the following may be said: The conversion of steam railways for electric operation remains an expensive proceeding, as it involves a complicated chain of apparatus to replace steam locomotives. The replacement costs can be saved in cases where a new railway is to be built, but in general this is not the problem. No definite statement can be made as to when it will pay to electrify; it will certainly not pay to do so for all trackage of all American railways. The indirect as well as the direct economies may, however, be large in many special cases. In terminals in large cities, on heavy gradients, for suburban passenger services and in certain cases for long-haul services electric traction has been a good investment.

In cost of installation and operation there are no great differences between direct and alternating current. The writer has found, however, that such differences as do exist are in favor of the alternating current.

Ship and Trolley Car in Collision

THE first recorded collision between a ship and a trolley car is reported from Dublin, Ireland. The vessel, a three-masted sailing ship, the *Cymric*, was about to enter the Ringstead Dock and was waiting for the trolley car to cross the drawbridge at the dock entrance, but swaying with the tide her bowsprit projected over the bridge and rammed the car, smashing the windows and terrifying the passengers, without, however, injuring anybody. The trolley car retained its balance and successfully crossed the bridge.

Why Electrify the Chilean State Railways?

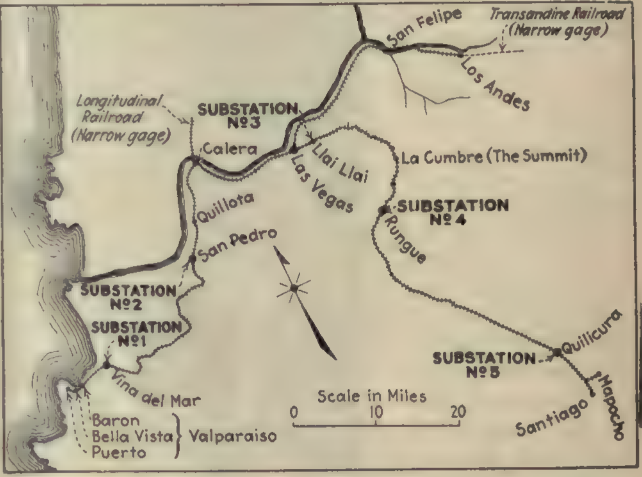
Recommendations of Special Commission Influenced Government to Plan for Extensive Substitution of Electricity for Steam to Save Fuel and Increase Track Capacity—Valparaiso-Santiago Section Selected for Immediate Transformation

THE decision of the Chilean government to electrify at once the State Railways in what is known as Zone 1, surrounding Valparaiso and Santiago, was the result of the work of a commission which reported its findings in 1918 after elaborate study. While the commission was engaged in its work, the congestion in Zone 1, which had become severe on account of the traffic due to the World War, was in part relieved by the purchase of Mikado-type steam locomotives. Traffic demands had reached such a point, however, that a considerable laying of new track was inevitable unless the tonnage over the existing track could be increased. The commission found that electrification was the solution to the problem, particularly in view of the fuel situation, Chile being dependent to a considerable extent on foreign countries for fuel.

In the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 3, 1921, page 991, the general features of this electrification project, involving 144 track miles, were given and illustrated, the statement being made that the initial order for equipment involved an expenditure of $7,000,000. This order was placed with the Westinghouse International Company. The present article elaborates some of the detail suggested there, particularly with reference to track and traffic conditions.

GRADES ARE SEVERE IN ZONE 1

The road is double-tracked between Valparaiso and Limache, a distance of 27 miles; between Ocoa and Llai Llai, 8 miles, and between Yungai and Mapocho Station, a distance of 1½ miles, making a total distance of 36½ miles of double-track line. The track is 5 ft. 6 in. gage, laid on Chilean oak ties and rock-ballasted practically the entire length of the line in the first zone. Eighty-five-pound rails are used between Llai Llai and La Cumbre and between Calera and Ocoa. The rest of the line between Valparaiso and Santiago is laid with 80-lb. rails, while the branch to Los Andes is laid with 75-lb. rails.



ZONE 1 OF CHILEAN STATE RAILWAYS, SHOWING TRACK TO BE ELECTRIFIED AT ONCE

The curvature of the line as a whole may be considered as of medium severity. The maximum curves are 10 deg. and are located near Los Loros. On the eastern slope the maximum curve is 9.5 deg., located near San Ramon. The line between Batuco and Quilicura is practically level, tangent track.

The largest bridge, known as the Las Cucharas Bridge, is that over the Vina del Mar River near Valparaiso. This is a steel structure of the cantilever type, 440 ft. long, carrying two tracks. There are a number of girder-type bridges, up to 250 ft. in length.

The six tunnels on the main line are known as Los Maquis, Los Loros, Centinela, San Pedro and the two Paso Hondo tunnels, the latter being located on the double-track section. The longest is San Pedro, 1,600 ft. in length. The first three tunnels are located on the Tabon or maximum grade section between Llai Llai and La Cumbre. All the tunnels are dry except San Pedro, so that the problem of corrosion of overhead line material is not serious. The clearances from rail to roof are not such as seriously to interfere with the

DEEP ROCK CUT ON THE EAST SLOPE, NEAR SAN RAMON

AT LA CUMBRE (THE SUMMIT)

design of the overhead material or the locomotives. The grade conditions have always been an obstacle in the way of moving the traffic in the first zone advantageously. It has been necessary to maintain several helper sections to handle the freight traffic, while practically all passenger trains require helpers ascending the Tabon grade between Llai Llai and La Cumbre. With electric operation all helper service will be eliminated, except in connection with the freight trains ascending the Tabon grade. This maximum grade is 2.25 per cent, and the summit has an elevation of 2,600 ft. above the level of the sea. The maximum grade on the eastern slope is 1.81 per cent and is located near San Ramon. The elevation of Santiago is 1,800 ft. above sea level.

West Portal of the Los Maquis Tunnel, Located on the Tabon Grade Between Llai Llai and La Cumbre

The freight tonnage southbound from Valparaiso averages approximately 3,600 gross tons daily, while that passing Las Vegas in the same direction is 3,900 tons. The northbound traffic is only slightly less than that of the southbound.

At present the freight trains going toward Santiago are made up of twenty to thirty cars each, an average trailing load of 550 tons. These trains are hauled by Mikado-type steam locomotives assisted by a Borsig Consolidation between El Salto and Pena Blanca and on the Tabon grade. In the opposite direction a helper locomotive is used between Til Til and Rungue.

With electric locomotives, 770-ton trailing loads will be hauled by one locomotive in either direction, except that in ascending the Tabon grade a second engine will be used. The trailing weights will be increased 40 per cent and the number of trains reduced approximately 28 per cent. Through freight trains that now make the one trip in ten to twelve hours will go through in six to seven hours.

Under normal conditions the express passenger trains carry six to ten cars, or a trailing load of 200 to 300 gross tons, in either direction between Valparaiso and Santiago. Occasionally these trains are composed of as many as sixteen cars, and helper engines are used on the Tabon grade. The express passenger trains are for the accommodation of first and second class passenger traffic and are the fastest trains in the service, making only a few stops in the 116-mile run. The omnibus trains, which make all stops between Valparaiso and Santiago, are always the most heavily loaded passenger trains in the service and carry cars for the accommodation of first, second and third class passengers. The electric locomotives for this service will be capable of hauling the 300-ton trains in either direction without the aid of helper engines on any section of the line.

Puerto Station in Valparaiso, Station Building on the Right

Local passenger trains are operated between Valparaiso and Llai Llai and intermediate points. At present many of these trains carry ten cars between Valparaiso and Vina del Mar, while the engine ratings provide for a maximum of twelve cars per train. These trains are composed of first, second and third class cars, usually hauled by one locomotive, as this section of the line does not have the most severe grade conditions. The electric locomotives for this service will be required to haul trains of 260 to 350 tons on the local runs, including the 300-ton trains of the Los Andes branch.

With electric operation it is proposed to reduce the running time of the fastest passenger trains between Valparaiso and Santiago from three hours and forty minutes to three hours and fifteen minutes.

Letters to the Editors

Baltimore Officials Like the Two-Door One-Man Cars

THE UNITED RAILWAYS & ELECTRIC COMPANY
BALTIMORE, MD., Jan. 24, 1922.

To the Editors:

I have just read W. G. Gove's criticism of an article by L. H. Palmer, president of the American Electric Railway Transportation & Traffic Association, and am particularly interested in Mr. Gove's statement concerning the question of standardization.

I believe that standards are of great value; in fact, the street railway industry without standards could not make proper progress, and I do not believe, by any means, that the standard Birney car is the last word in safety car construction. Many of its details have not been carefully worked out, and certainly these faults should not be considered standards.

I do not consider that any of us mechanics are qualified to make the statement Mr. Gove does in the first two lines of the third paragraph of his letter, as the selection of the proper type of car is a decision that should be made from the operating standpoint by the operating man.

A. T. CLARK,
Superintendent Rolling Stock and Shops.

THE UNITED RAILWAYS & ELECTRIC COMPANY
BALTIMORE, MD., Jan. 24, 1922.

To the Editors:

I wish to reply to the letter dated Jan. 14, 1922, published in your Jan. 21 issue, on page 114, by W. G. Gove, superintendent of equipment of the Brooklyn Rapid Transit Company. It is evident that the subject is not yet clear in Mr. Gove's mind, and this is the reason I am commenting further.

His statement made in the third paragraph of his letter, as follows, "The Birney standard car is without question applicable for any service in any city or any community," cannot be substantiated nor defended. Much as we believe that the one-man car with separate exit and entrance, as in use in Baltimore and other places, is a distinct improvement over the so-called Standard Birney car, we would not by any stretch of the imagination be rash enough to apply it to the clause I have just quoted.

We are not against standardization in Baltimore, and I feel sure this applies to Chicago, but we are against standardization when it means forcing something down the throat of the industry, which is not as adequate or efficient as another design, and that apparently is what is in Mr. Gove's mind.

"The proof of the pudding is chewing the string" according to an old adage, and we cordially invite any one interested in the purchase of additional one-man cars to come to Baltimore and see the two types in operation. I am sure that one-half an hour spent in watching the operation during any rush hour period will convince any practical operating man of the justification of our position. I say this with full confidence, because several "doubting Thomases" have already been convinced by this method. Here and now, I extend an urgent invitation to my good friend Gove to jump on a train for Baltimore and come down and be convinced.

Far from blocking the wheels of progress, we are trying to improve conditions, and we suggest to our friends in the industry, if they are still doubtful about this question, that they come down and let us show them. It would be a great pleasure for any of us to take enough time thoroughly to demonstrate to Mr. Gove and any one else, just why the newer design is so superior to the old one.

L. H. PALMER,
Assistant to President.

Transfers Show Point of Origin

BIRMINGHAM RAILWAY, LIGHT & POWER COMPANY
BIRMINGHAM, ALA., Jan. 15, 1922.

To the Editors:

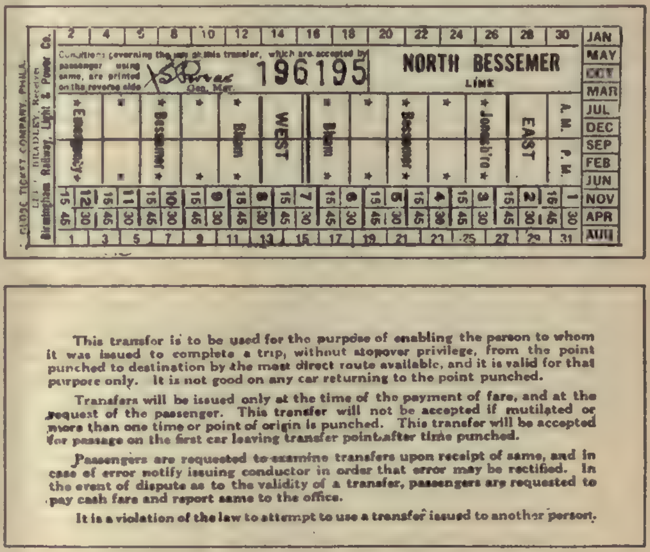
I read with interest the editorial appearing in your issue of Dec. 31 relative to the issuance and use of transfers, and I suppose your conclusion regarding railway properties is that each is quite similar to a mother with her children. Each one thinks that her own are paragons of excellence, so I cannot refrain from calling your attention to the transfer in use on this company's property.

The prevailing idea that seems to exist with railway properties is to restrict a passenger to a specific line and at a specific point when a transfer is made, with the result that transfers as a rule are so complicated in showing on the face on just what line they are valid that the conductors themselves get confused, make numerous errors and provoke unfavorable criticism of the whole transfer system.

Our policy in Birmingham is that we are not particularly interested in just what line a man uses a transfer on, so he does not make a round trip for one fare. We have therefore adopted a transfer which indicates on the face of it the point at which, or points between which, the passenger boards the car. The transfer is then punched fifteen minutes after the arriving time of the car at its terminal, which is usually the central business district, and the transfer is then good up to and including the first car passing a transfer point after the time punched, provided it does not take the passenger back in the direction from which he came.

The station master punches the month with a triangular punch when the transfer is issued. The conductor then punches the date, the time and the point of origin on the transfer.

By the use of this transfer, conductors on regular runs are usually familiar with the approximate number of passengers they will receive requesting transfers at principal loading points, and at their leisure in approaching these points they are able to punch the point of origin and the time, so that there is no confusion and less opportunity for errors than in attempting to punch a dozen different destinations on a transfer when passengers are boarding in large numbers and each passenger is asking for a different destination.


Conditions governing the use of this transfer, which are accepted by passenger using same, are printed on the reverse side
Gen. Mgr.
196195
NORTH BESSEMER
LINE
Birmingham Railway, Light & Power Co.
GLOBE TICKET COMPANY, PHILA.
WEST
EAST
A. M.
P. M.
Bessemer
JAN
MAY
OCT
MAR
JUL
DEC
SEP
FEB
JUN
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This transfer is to be used for the purpose of enabling the person to whom it was issued to complete a trip, without stopover privilege, from the point punched to destination by the most direct route available, and it is valid for that purpose only. It is not good on any car returning to the point punched.

Transfers will be issued only at the time of the payment of fare, and at the request of the passenger. This transfer will not be accepted if mutilated or more than one time or point of origin is punched. This transfer will be accepted for passage on the first car leaving transfer point after time punched.

Passengers are requested to examine transfers upon receipt of same, and in case of error notify issuing conductor in order that error may be rectified. In the event of dispute as to the validity of a transfer, passengers are requested to pay cash fare and report same to the office.

It is a violation of the law to attempt to use a transfer issued to another person.

FRONT AND BACK OF BIRMINGHAM TRANSFER

We have a charge of 2 cents for a transfer, and this necessarily reduces the number issued to the passengers who actually desire to continue their journey on another car, and the misuse and abuse of transfers is minimized materially, as there is very little disposition on the part of passengers to purchase transfers and give them away or exchange them. For instance: During November, 1920, this company lifted 938,711 transfers. During November, 1921, we sold 542,486 transfers, which indicates the disinclination of passengers to obtain transfers unless they actually desire to use them.

I am inclosing a sample of the transfer mentioned, thinking that it might prove interesting, since the subject has been discussed.

No doubt local conditions govern to a large extent the character of transfer used, but wherever it is possible, local conditions permitting, to use a transfer such as is in use here, I believe errors by issuing conductors and misuse of transfers would be reduced materially.

We use a different color of transfer for each line, and with the month and date being punched out by the station master and the conductor, we are enabled to effect a very considerable saving over the practice of printing the date in large figures on the face of the transfer.

T. G. BRABSTON,
Superintendent of Transportation.

New York State Men Wide Awake

Discussion at New York City Meeting on Jan. 24 Showed Keen Interest in Reducing Platform Labor Cost, Insuring Reasonable Conditions in Regard to Compensation Claims and Promoting Relations of Mutual Value Between Cities and Railways

AT THE twenty-fifth midwinter meeting of the New York Electric Railway Association, held at the Astor Hotel on Jan. 24, three principal subjects were discussed: One-man car operation with double-truck cars; workmen's compensation claims as a continuing and increasing liability to railway companies, and one year's experience with the cost-of-service plan in the city of Rochester, N. Y. These topics were carried in papers prepared respectively by H. S. Sweet, engineer of equipment New York State Railways, Syracuse; Martin E. Burke, assistant general attorney Interborough Rapid Transit, New York City, and Charles R. Barnes, Commissioner of Railways, city of Rochester. Abstracts of the three papers appear elsewhere in this issue.

President W. O. Wood, New York & Queens County Railway, presided at the morning and afternoon sessions and at an informal dinner in the evening. About 200 men were in attendance.

One-Man Double-Truck Car with Turnstile

The program opened with Mr. Sweet's paper, which he read. He then showed lantern slides made from photographs and drawings to illustrate the paper. This discussion was opened by W. H. Collins, Gloversville, who reported using a few one-man, double-truck cars. He considered the turnstile plan described by Mr. Sweet to be promising. W. J. Harvie, Auburn, stated that his company operates one-man cars satisfactorily with entrance and exit at the front. He asked as to the saving in duration of stop which results from the turnstile plan, and called attention to the effect of bad weather. Mr. Sweet replied that with light traffic and seated load there is little saving, but in rush-hour and other heavy traffic the stop is reduced from 20 to 25 per cent. Stating that in Auburn the boarding and alighting accidents with one-man cars are negligible, Mr. Harvie asked regarding this feature with the new cars, and especially as to the effect of two doors being open at once. Mr. Sweet replied that careful investigation had shown the turnstile cars to be slightly safer than others. He attributed the smaller number of collisions with vehicles to the fact that the car is at rest when fares are being collected. There was no trouble due to the opening of the front and rear doors simultaneously.

President Wood suggested that the new plan has been in use but a few months. It will require a year's experience before a definite conclusion regarding it can be reached. Mr. Sweet pointed out, however, that the turnstile cars had come through the Christmas rush successfully, in Syracuse and Utica, with a satisfactory accident record. Further, as to schedules, the timetable department finds these to be well maintained. B. E. Tilton, Syracuse, said that after three months, one-man operation had reduced boarding accidents 65 per cent and alighting accidents 45 per cent. Records were made on a car-mile basis, although passengers handled might be a better basis.

The Turnstile Car an Evidence of Salesmanship

In reply to a number of questions Mr. Sweet stated first that there is no trouble in fare collection, the inspection plate in the fare box being brightly illuminated. Again, the turnstile normally permits only entrance but can be unlatched to let passengers out in emergency. Finally, the public likes the turnstile plan.

A. J. Manson, Westinghouse Electric & Manufacturing Company, expressed appreciation of the new car plan as an evidence of transportation salesmanship. This device improves service and suggests that in "doing something different" the railways advertise their service.

C. H. Beck, Westinghouse Traction Brake Company, said it is interesting to hear the one-man car referred to in the past tense, which indicates the progress made recently. As to the double truck, one-man cars, the proponents of the Birney car had no idea of flooding the country with single-truck cars to the exclusion of the larger ones. The railways must operate these large cars, but the Birneys must be credited with establishing the practice of one-man operation. Once established, this practice can now be extended until practically all cars are so operated.

Single-Truck Has Wide Field

Mr. Beck called attention to the general characteristics of city travel which are favorable to the small car and which involve picking up a load and delivering it at different points, although the operation of some lines involves loading and unloading simultaneously. In Baltimore there is a "crescent" cross-connecting line of this sort on which the safety car has stood the "acid test."

H. W. Blake, Electric Railway Journal, asked Mr. Sweet these questions: (1) What would be the effect of the new plan on short-haul passengers, due to their having to force their way through the car? (2) How does the turnstile car compare with the two-door safety car? Mr. Sweet replied that with any near-side car the front is crowded in rush hours. The short-haul rider like others has difficulty in boarding. This is more serious than his being forced to crowd his way from rear to front.

Asked by Mr. Wood as to the sacrifice of seating capacity due to the turnstile, Mr. Sweet said that while some seating capacity is lost with the Peter Witt cars, the standing capacity is increased. With the rear-entrance cars some standing room is used but with other one-man cars the rear platforms are not usually filled anyway. He also answered F. A. Stratton, Mount Vernon, who asked as to odd-coin fares in relation to the new plan, by saying that there is no trouble in collecting the 6-cent fare in Syracuse and the 8-cent fare in Utica. Locked boxes are used.

One-Man Cars in Brooklyn

C. E. Morgan, Brooklyn, said that the Brooklyn Rapid Transit Company operates 256 one-man cars of which 206 are standard Birneys. The others are double-truck cars with safety features. Experience with these has taught the importance of fitting the type of car to the service. There is a limit beyond which the single-truck car cannot go, and a larger car is demanded. Further, it may be necessary to employ two men in the rush hour on cars otherwise one-man operated.

In all of this the type of car whatever it is must first be "sold" to the employees and through them to the public if it is to be applied successfully.

Overlapping Zones with One-Man Operation

A. V. Louer, Albany, started the discussion on a new tack by asking about the collection of fares on one-man cars in overlapping zones. His company is equipping double-truck cars for one-man operation, but finds little information on this phase. He makes two collections and finds that 80 per cent of the traffic originates in the overlap. It is necessary to identify passengers as they board.

Mr. Collins said that he has a somewhat similar problem on a line running in two adjoining cities, where an 8-cent fare is collected in one city and a 12-cent fare in the overlap. The two fares are collected at entrance, and a double register is used. At first a surrender slip was used but it was found to be unnecessary as the operator could check his load at the edge of the first zone.

Mr. Beck cited an overlap zone situation in Philadelphia, in which identification checks were passed out as the car entered the second zone. Mr. Stratton said that on his property the car is stopped at the edge of the zone for the collection of fares. Mr. Wood said that his case is similar to those mentioned but with the additional legal complication that the fare be all collected at one time.

ONE-MAN CARS IN NEW YORK

R. E. McDougall, New York City, next reported as to the use of one-man double-truck cars on the New York & Harlem Railroad traction lines. In July, 1920, one-man operation was started on the 86th Street Crosstown line, 1.1 miles long. Thirty-five-foot cars are used, eighteen being required in rush hours, ten at other times. The operation is satisfactory and the passengers and men like it. After a year the plan was extended to the Madison Avenue line and is now used for night service and for partial Sunday and holiday service. What is needed next is a turnstile type of double-end car. This, Mr. Sweet said, will be put out soon on the New York State Railways lines.

J. W. Welsh, American Electric Railway Association, pointed out that there are three passageways on the standard type of double-truck car. Does the new car, he asked, cut out one of these? Mr. Wood said that passengers do not always use all of the passageways available to them; and Mr. Sweet added that the front doorway on the turnstile cars can be used for entrance if necessary.

Asked as to why three-quarters of a minute per mile is added to the schedule with one-man operation B. E. Tilton said that this (which is an average and not a maximum allowance) is not allowed on all lines and may later be cut out. It was largely put in by the company because of the newness of the service.

Afternoon Session

After a buffet luncheon, which was served in an adjoining room of the hotel for those in attendance, the discussion on the use of double-truck cars for one-man operation was continued.

J. K. Punderford, vice-president and general manager the Connecticut Company, told of its operation of cars by one man. The company's present service includes 132 Birney cars and forty-five converted one-man cars. In addition to these, all the double-truck cars in Bridgeport are now operated with one man. As the time afforded for changing to one-man operation was very short, these cars were not equipped with full safety devices. Mr. Punderford also told about a method of collecting fares on a four-zone one-man bus line operated by a company between New Haven and Devon. The fare per zone is 10 cents. The first two zones are operated pay-enter and pay-leave. Passengers entering the bus in the third zone receive a blue check and those leaving the bus in the third zone must deposit in the fare box either a blue check and 10 cents or 20 cents in cash. Those that enter the bus in the fourth zone receive a red check and those that leave the bus in the fourth zone must deposit either a red check and 10 cents or a blue check and 20 cents or 30 cents in cash. Mr. Punderford also commented on the turnstile arrangement as described by Mr. Sweet and suggested that a pair of flappers might be used which would permit entrance but prevent passage in the opposite direction, and on double-end cars these could be hooked back when not in use so as to give a free passage.

A. E. Reynolds, general manager United Traction Company, Albany, N. Y., described the use of one-man cars on his road. The big problem which they have had to solve since the strike has been the breaking in and training of green men. The use of one-man operation has resulted in a slowing up of service to some extent, and the length of lay-over at the end of the lines has been extended in order to permit the men to make out their reports, which require extra time.

Ernest Murphy, assistant general manager United Traction Company, Albany, N. Y., told of the work of the mechanical department necessary for the converting of the company's cars to one-man operation. This work was also made somewhat difficult due to the use of men who were unfamiliar with car equipment. At present they are operating eleven safety cars and eighty-eight remodeled cars. Of this latter number thirty-seven are single-truck cars and the remainder double-truck cars. A new feature is the use of the rear door, which is controlled by the operator at the front end. This control is effected at the air brake valve in a similar manner to that used on Birney cars, and in order to provide for individual operation of the rear door or the front door or a combined operation of the two doors a selector valve has been added to the equipment. This valve is placed in the rear door position when operation of the rear door is necessary, and then the control is effected from the air brake valve in the usual manner. Where it is necessary to operate the front door, the selector valve is placed in the front door position and operation of this is controlled from the air brake valve. When both doors are to be operated, the selector valve is placed in the central position and operation is effected in a similar manner.

WORKINGMEN'S COMPENSATION CLAIMS

The discussion on this subject was initiated by a paper by Martin E. Burke, assistant general attorney Interborough Rapid Transit Company, New York. An abstract of this paper will be found elsewhere in this issue.

The first delegate to discuss this paper was R. J. Messenger, claim agent Rochester & Syracuse Railroad, who said that company followed the principle of self-insurance. Through an accident-prevention campaign which had been conducted the seriousness of the accidents had been decreased, though strictly speaking the number had increased because now reports are made on every accident, no matter how slight, in the shops.

Charles R. Morrison, vice-president and general manager Utilities Mutual Insurance Company, New York, said that the cost of insurance compensation was increasing, as New York had the most burdensome compensation law in the country, but it was having the effect of making employers more careful. He believed that all companies should organize and get the public to organize to reduce accidents. While self-insurance could safely be used by large companies, a number of large companies had joined his insurance organization, so as to assist in giving it stability and to make it more desirable for the smaller companies. An advantage in mutual insurance was that it brought to each member the experience of all of the companies in accident reduction.

B. E. Tilton, vice-president and general manager New York State Railways, Syracuse, said he was a strong believer in safety campaigns.

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railway, said that company carried part of its own liability insurance and also carried part in the Utilities Mutual, and had got great help from the inspectors of that company. He mentioned a case where a trainman had made a claim for a dislocated knee. After about nine months, during which the company had paid between $800 and $900 for this injury, it had been discovered that the trouble complained of had been experienced by the trainman several times before and while on the invalid list similar trouble developed in the other knee. The conclusion reached was that the trouble was due to a disease and compensation was stopped, but the writer was uncertain whether the company had any redress.

R. R. Hadsell, superintendent of transportation of city lines, Rochester, said that company had inaugurated on Jan. 1, 1922, a safety campaign in which a feature was a campaign to reduce carelessness by automobile drivers. Committees were organized among the trainmen and violations of rules of the road observed on the part of automobilists were reported to a central officer, who either communicated the information to the city officials or sometimes, if the offender was a truck driver, made a direct complaint to the owner of the truck. The method had proved most efficacious, not only in reducing such acts of carelessness, but in interesting the railway trainmen in accident reduction.

DISCUSSION ON MR. BARNES' PAPER

In the discussion on service at cost in Rochester J. K. Choate commented on the valuable work done by Mr. Barnes while with the Public Service Commission of New York and said that he considered that Rochester was particularly fortunate in having the services of such an efficient man in helping to solve its transportation problems.

THE BANQUET

One hundred and sixty-eight railway and supply men attended the dinner in the evening. The speakers were Fred S. Purnell, Congressman from Indiana, and Edward J. Rice of New York. Mr. Purnell's subject was "The Turn of the Tide in American Problems Today." Mr. Rice's subject was "What the World Needs—More Humor." In this particular instance the usual order was reversed in that the serious speaker came from Indiana while the fun was furnished by the gentleman from New York.

Mr. Purnell did lighten up his talk with well-chosen humorous illustrations, but for the most part his plea was that the only "isms" which should be tolerated in America were Americanism and patriotism. His introduction to the diners by Toastmaster William O. Wood was with one exception the shortest in his career, Mr. Purnell said.

The speaker asked that the diners try occasionally to picture themselves in the place of their representatives in Washington. Recently one of Mr. Purnell's constituents had written him asking him to try to reduce taxes, increase wages, lower the tariff and find a loophole in prohibition. Many different interpretations were put on the same thing in different parts of the country. Thus he learned on a recent tour of investigation that to the farmer of Maryland the corn crop there meant something entirely different from the 200 gallons to the acre interpretation of the Kentucky farmer. Mr. Purnell thought that the problems of reconstruction were infinitely greater than those of the war. A rebellious spirit was rampant in the country. This spirit was dormant in some, but outspoken in others. He said that two things were needed at this time: First, a definite program for looking after the needs of the workingman. Second, a plan to help every workingman to own his own home.

Mr. Rice told one good story after another. A story of his especially pleasing to the railway men was one about a Jewish crew, recently hired and assigned to a dull run on the Spring Street line where the receipts were only a few dollars for the first day; they got disgusted the second day out and ran the car on Broadway, with returns so large as to attract the superintendent's attention.

One-Man Car Operation with Double-Truck Cars*

Seventy-Five Cars Have Been Equipped with a Turnstile to Admit Passengers Who Pay as They Leave

BY H. S. SWEET
Engineer of Equipment, New York State Railways

IN THE spring of 1921 it was decided to try one-man car operation on several of our heavy carrying lines in the city of Utica. Our previous experiences with hand-brake, single-truck, one-man cars on a couple of shuttle lines and in the cities of Rome and Oneida had made us anxious to extend this type of service.

During the greater part of the day the schedule on the lines in Utica on which we contemplated trying out the one-man cars had as short a headway as was practical with the existing single track and location of switches. This made it desirable to use a one-man car as large as those which we were already operating with two men. The cars which were running on these lines were of two types: the double-truck Peter Witt cars, weighing 32,000 lb., and a few of the rear-entrance front-exit older pay-as-you-enter cars, weighing approximately 45,000 lb. The only changes made were to move the fare box and relocate some stanchions. The results obtained from these cars with one man showed that it was perfectly feasible to operate a double-truck car with one man and that the thing to decide in the future extension of our one-man car operation was the ultimate economic difference between buying the so-called safety cars or using our existing double-truck equipment.

"There is much to be said on both sides," to use the old-time expression, and the decision must depend on the relative weights given to the advantages and disadvantages of the different kinds of equipment. The relative weights will vary greatly according to the conditions under which the cars are to be operated, and which will hold in one city will not necessarily be true in another. In fact, while some lines might indicate advantages by use of one-man double-truck cars, other lines in the same city could be operated more economically with single-truck one-man cars.

In this problem, the maintenance per car-mile and the power consumption per car-mile should receive proper relative value, as a car seating thirty-two passengers and carrying fifty-five to sixty during rush hours should not be compared on a direct car-mile basis with a car seating forty-five to fifty-four passengers and carrying from 115 to 125 during rush hours. As it is necessary for any company to have enough car carrying space to handle the peaks of traffic, the lower power consumption and supposedly lower maintenance per car-mile of the single-truck car is offset, if not overshadowed, in the total maintenance account by the fact that if larger cars are used, fewer are required to handle the traffic.

The question of the maximum number of cars it is necessary to operate is a very important factor as it has a direct bearing not only on maintenance, size of shops, accidents and power consumption, but also on platform time, money invested and congestion in the streets. It should also be remembered that to give the same riding qualities, the single-truck car requires a much higher degree of track maintenance than the double-truck car, which means that some track might require the expenditure of a considerable sum before it would be suitable for single-truck cars.

In making a survey of the advisability of either single-truck or double-truck one-man operation, one must not lose sight of the fact that the net return on money invested is of paramount

TURNSTILES APPLIED TO TWO TYPES OF ONE-MAN CARS IN SYRACUSE

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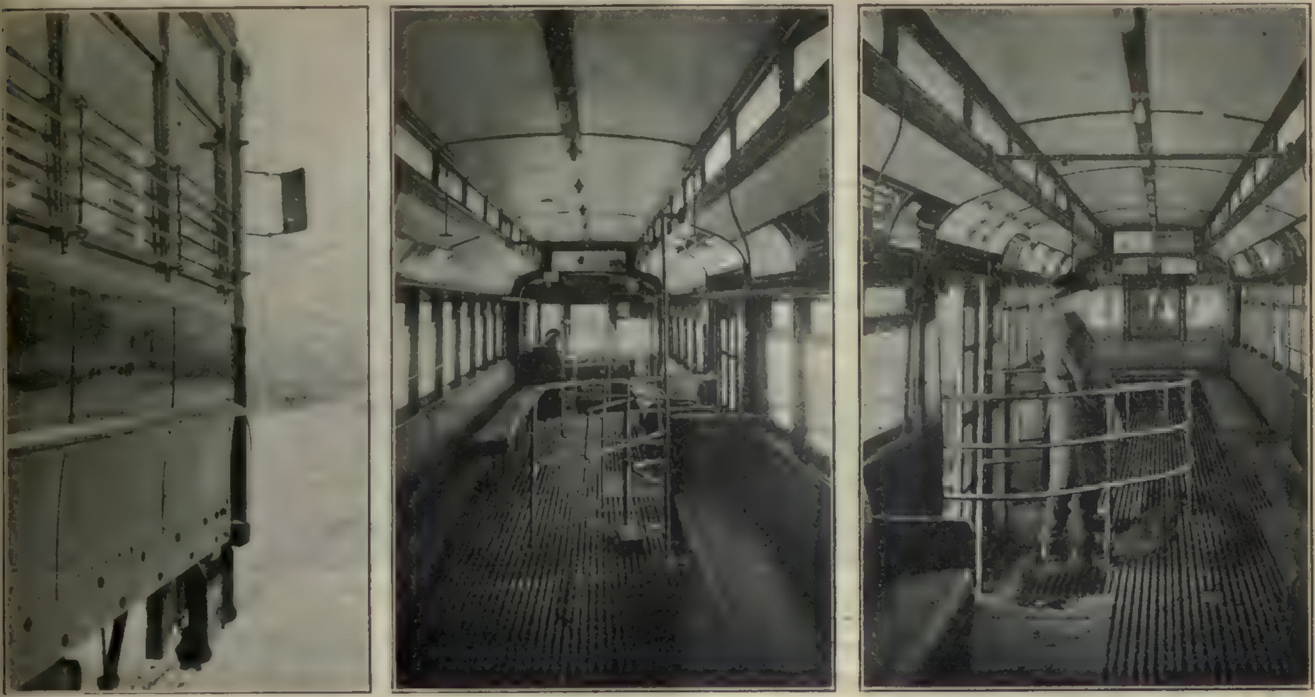
*Abstract of paper read at midwinter meeting of the New York Electric Railway Association, New York City, Jan. 24, 1922.



View at the Left Shows the Motorman's Mirror. Views in Center and at Right Show Turnstile Applied to Peter Witt Car

importance and the comparative cost of operating, maintaining, etc., different types of cars on the system is only secondary and, when taken separately, should have no real weight in the decision. Of course, if the company has not enough equipment and has to purchase some extra cars, a balancing of these various factors might show that it would be advisable to get the single-truck car under some operating conditions.

As we intended to try out one-man operation in Syracuse and extend this type of service in Utica, we investigated the single-truck and double-truck car one-man operation from the angles mentioned above and others, not forgetting the possibilities of increased riding which would result from any increase of service that it would be possible to give with the single-truck car.

As a result we decided to use the double-truck cars. It was practically mandatory in Syracuse, as the speed of cars during rush hours is considerably slowed down by the number of cars and other vehicles on the street, and to have used a sufficient number of single-truck cars to handle this rush-hour traffic would have increased the congestion materially. Even if we had been able to disregard the question of congestion we would have reached this same decision on account of the greater economic benefit to be derived from double-truck operation.

Turnstiles Reduce Congestion at Front End

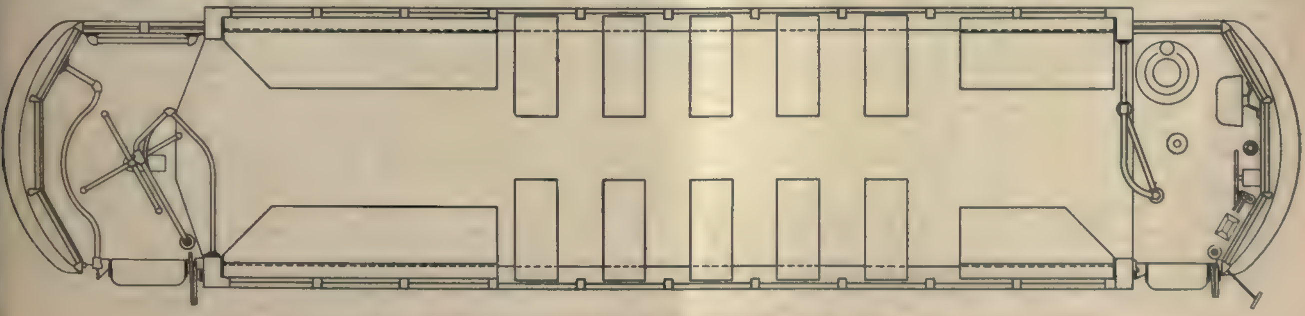
With the extensive introduction of one-man double-truck cars we found what we had already anticipated to a certain extent, namely, that the congestion of boarding and alighting passengers who were forced to use the same door for both entrance and exit slowed down the service. This, of course, is true on the single-truck Birney car, only to a lesser degree, as the car does not carry as many people. One cannot but notice this upon looking at some of the photographs which advertise the Birney car.

From the previous experience that the railroads have had with the near-side car, this congestion and unwillingness of passengers after entering to go to the rear was to be expected, for either double or single-truck one-man cars which have entrance and exit on the same end are fundamentally near-side cars.

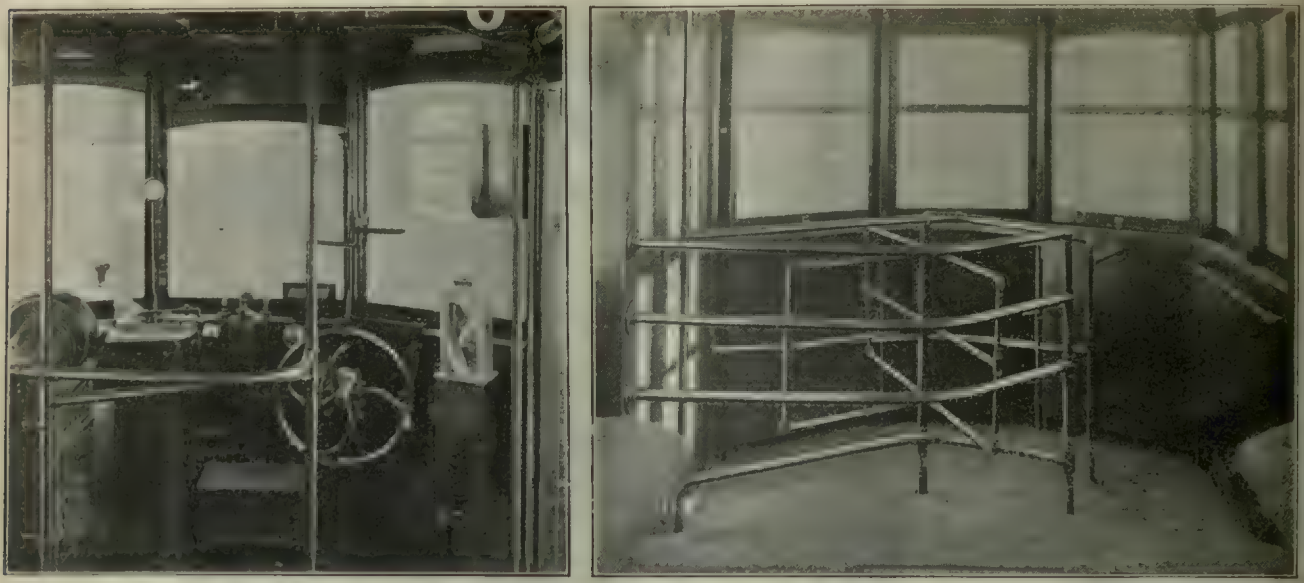
On cars with narrow front vestibules, which operated on a line where there was much boarding and alighting at the same time, this delay was a serious matter both to the schedule and the convenience of the public, especially during inclement weather. On cars with a wide front vestibule and double doors, the delay was considerably less but it was still a source of much annoyance. To remedy this trouble we tried remodeling different types of cars.

On the lines which operated cars with large front door openings and not many points where simultaneous boarding and alighting occurred, the rear or the center doors, as the case may be, were put under the control of the operator so that he could use them during rush-hour periods at points where an inspector was stationed. This helped considerably, and we are operating more than eighty cars thus equipped.

On the crosstown lines where single-end cars with narrow front vestibules are operated and where there was considerable simultaneous boarding and alighting, we operated the car on the pay-as-you-leave principle with the rear door, which was placed under control of the operator, used for entrance of all passengers. A turnstile was located at the rear entrance to allow passage in the entrance direction only. A mirror projecting from the front vestibule corner post gives the operator a com-



Plan Showing Turnstile Applied to End Entrance and Exit Car



Front and Rear Ends of Double-End Car—Rear Doors Are Operated by Handles Shown in First View

plete view of the outside of the car and rear step both day and night, for at night a bank of lamps placed over the rear step is arranged to light automatically with the opening of the rear door. After considerable experimenting as to the exact location and design of the turnstile, arrangement of the mirror, etc., we completely equipped one crosstown line in Syracuse in August, 1921.

At any time, but particularly during the rush hours, it is almost impossible to induce passengers to fill up the rear of the front entrance and exit type of car. The turnstile rear-entrance type automatically took care of this load distribution as the passengers knew that they would have to leave by the front door and therefore moved forward. It was soon apparent that this type of car could carry the public with less congestion at the doors and far better distribution of load than our other one-man cars.

We then rapidly increased our one-man turnstile cars until today we are operating with this type three lines, or about forty-five cars in Syracuse and all the crosstown lines (or thirty cars) in Utica. We are also experimenting with equipping the Peter Witt and double-end cars with turnstiles and have had such good success with the Peter Witt cars equipped with turnstile at the center door that we are going to equip many more in the near future. The double-end car does not as readily lend itself to the turnstile and we have not yet operated any thus equipped.

If the operating company decides to use safety features, the double-truck one-man car lends itself readily to any type of safety feature used in single-truck cars.

In fact, we are operating in Syracuse on some of our one-man cars the so-called "dead-man" control and other safety features, somewhat similar to the standard Birney car only they give more protection in various ways. On the turnstile type of car the turnstile is freed automatically during an application of emergency brakes, thus allowing the rear or center door to be used as an exit.

Double-Truck One-Man Cars Satisfactory

From our experience in double-truck one-man operation, we believe that in its present form it opens up great possibilities for economies in the operation of cars in large cities and heavy traffic, and that any railroad company which contemplates one-man car operation should make a careful investigation before deciding whether it is going to operate with single or double-truck equipment. If a company must purchase new equipment, it should be sure to get the proper kind of car for the service desired, and in many cases the double-truck one-man car will prove to be the most economical when everything is considered at its proper value.

In conclusion, I might say something regarding the difference in running time with one man or two men operating the same general size of double-truck car. We have found it was only necessary to increase our running time on our present one-man car a maximum of three-quarters of a minute a mile over two-man operation, and this increase is during rush hours only and not on all lines. It should also be remembered that double-truck one-man operation is in its infancy and that with further education of the public and development of change and transfer-issuing machines, the car will undoubtedly be as fast, if not faster, than the older cars of the two-man pay-as-you-enter type.

Service-at-Cost in Rochester*

Advantages of Continuous Over Intermittent Supervision—One Year's Experience with Plan Successful

By C. R. Barnes

Commissioner of Railways in City of Rochester and formerly head of electric railway division, Public Service Commission, State of New York, Second District.

"HEY, BILL! We must be sure and flag the steam crossing today, as there is a public service commissioner in town."

This instructive information was given by a conductor from the tail end to his motorman on the front end of a car on which I was the only passenger. At the time I was chief of the electric railway division of the Public Service Commission. Upon my arrival in the city, an hour before this took place, I

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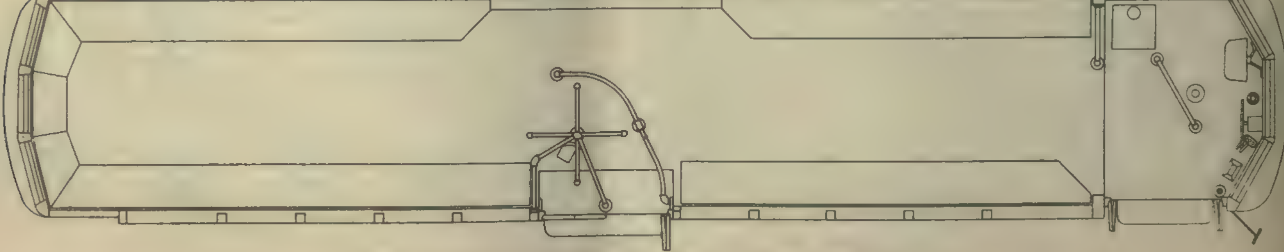
*Paper presented at midwinter meeting of New York Electric Railway Association, New York, Jan. 24, 1922.



Plan Showing Turnstile Applied to Peter Witt Car had called up the general manager and told him I had come to make an inspection of his road. This information had evidently filtered through to the car crews.

"Train 1004 was three minutes late last night, causing a hole of six minutes, resulting in two packed cars on the Park Avenue line. What was the cause and what will be done to prevent a recurrence?"

These remarks were made by the Commissioner of Railways to a representative of the operating department of the New York State Railways in the commissioner's office at one of the conferences which are held daily with the operating department for the purpose of analyzing the service of the day before. The basis of the remarks was the check of the service which is made daily during the morning and evening rush hours on all of the lines in the city of Rochester.

These two typify the practical results of intermittent and periodical state regulation of service on electric railways, as compared with the detailed, thorough and continuous supervision of service made possible under service-at-cost operation. Under the latter, the amount and character of the service are subjects of every day observation and control by the commissioner and his assistant. Under the former, it is not practicable for the State to employ the number of people necessary continuously to check service on all of the electric railways in the State. My experience, covering a period of twenty-five years, in this work stresses the fact that the railway manager is human and is governed by the same instincts which cause the district school teacher to dress up the school for the visit of the trustees.

For this reason, no matter how serious the complaint against service may be, on inspection by the public service commission, in some cases it is found to be adequate and satisfactory. Under service-at-cost operation the manager is deprived of this prerogative and must be on the level at all times as his service is under continuous scrutiny.

RESULTS OF FRANCHISE AND CAUSES FOR ITS ADOPTION

In Rochester the New York State Railways' lines, city and suburban, have been operated since August, 1920, under a service-at-cost contract, the terms of which have been given wide publicity. They include a varying rate of cash fare from 3 to 10 cents, with a reduced ticket fare in each case. The fare to be charged is contingent upon the net revenue, the company receiving a return based upon physical valuation and inversely affected by the rate of fare. The operation up to the present has been under a 7-cent cash and a 6½-cent ticket fare. The return to the company at this rate of fare is 6 per cent. The gross revenue for the year ended July 21, 1921, was $5,009,295.91. After deductions provided for in the contract, which includes the return to the company on the appraised value of the property, there was a deficit of $133,998.48 for the year. Operations since Aug. 1, 1921, indicate that the present year will show an improved financial condition.

Rochester is known in street railway circles as the home of the "Quinby Case." In this case the courts held the limiting 5-cent clause in the franchise to be valid. These court decisions were reached after a legal battle between the city and the company extending over several years. The natural outcome of this controversy was an extended public sentiment against the corporation. This was aggravated by the fact that under a 5-cent fare the company was obliged to curtail its service beyond the requirements of comfort and convenience.

The service-at-cost contract was the result of a "get together" effort on the part of the city and the company. The success of this plan of operation in the city of Rochester can be judged by the fact that prior to the execution of this contract the press of Rochester, both editorially and locally, contained daily criticism of the company and the service furnished by it. The files of the Public Service Commission also were filled with complaints in regard to it. As indicating a change in public sentiment, when the contract became effective, the increase in fare from 5 to 7 cents was accepted without general protest. That operation under the contract is satisfactory to the people of the city generally is shown by favorable newspaper comment, by expressions of city officials, numerous private citizens and civic associations.

A year and a half of operation has convinced me that the service-at-cost plan, as applied to the city of Rochester, is beneficial and equitable, both to the riders and the company. It is especially beneficial to the company during periods of business depression, guaranteeing it a stated return on investment. It is of advantage to the riders during times of normal business and boom conditions, as during these periods it prevents the company from exploiting to the limit a fruitful field of revenue. In other words, it stabilizes the amount street car riders shall pay and the amount the company shall receive. Further, it insures to car patrons the service for which they pay.

I feel that the service-at-cost contract in the city of Rochester has been a complete success and has fulfilled every anticipation of the people, the city and the company. This has been largely due to the splendid co-operation that has existed between the railway commissioner and the company, which has resulted in a service unequaled in any city with which I am familiar.

Workmen's Compensation Claims*

Considered as a Continuing and Increasing Liability to Electric Railway Companies—The Greatest Care Should Be Exercised in the Selection of New Employees.

By M. E. BURKE
Assistant General Attorney,
Interborough Rapid Transit Company, New York

WORKMEN'S compensation was investigated by a commission of the American Federation of Labor, the National Civic Federation, and by many other commissions and persons in this country and abroad. The workmen's compensation law of 1914 in New York State was drafted from scientific information gained from such investigations. It was and is the most liberal and humane law of its kind in the world. It would be supposed that a law enacted under such circumstances would stand until time and conditions required a change to be made. But we find that each and every year the law has been attacked, not by experts who understand its relation to industry and the principles upon which compensation is founded, but by solons who go to Albany for the first time and who believe they see in the compensation law a means of gaining favor with some petty labor organization. Their attack consists in increasing each and every burden imposed by the law.

The principle upon which industrial accidents were to be charged to the costs of production was that the burden on the community would be less than it was when adequate provision was made through public and private charity for taking care of injured workmen and their dependents. In theory the law was to do away with the necessity of extending charity by the community to those unable to work because of an accidental injury. The basis for the compensation was the charity that was generally extended in such cases. On such a basis, workmen would not extend their disability voluntarily. This theory, which was considered necessary to make the principle workable, no longer governs our Legislature. The one purpose now seems to be to increase the compensation to a point where the employee will get the same sum whether he works or remains idle; to do away with the waiting period so that weekly vacations can be taken with pay; to give to the employee his own doctor so that there will be no check by the employer when he does remain away.

The difficulty with the present theory is that all men are not honest; that most men work because they need the money; if they can get it without working, they ask, why work? If it were not for the wiser heads in the Legislature, who do their greatest work in killing vicious bills, organized labor would retire on compensation, or industry would become bankrupt. Although the law is perfectly understood at present because of the decisions rendered in the last seven years, and although it stands supreme in the bestowing of benefits, yet, this year, we find the same bills with the same purpose in view. The schedules are increased about 30 per cent. The awards under the schedules are no longer exclusive. Double compensation for the disability period is allowed, which means generally $40 per week. The deaf are to be compensated, which opens the door to stupendous frauds in this catarrhal climate. Many other changes are suggested, but it is unlikely that they will ever become the law in the present Legislature. It is hard to understand why supposedly intelligent men should think that compensation costs should be increased, when wages and all other commodities are on the decline, unless we decide that it is done for political advantage.

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*Abstract of paper read at midwinter meeting of the New York Electric Railway Association, New York City, Jan. 24, 1922.

The theory that industrial accidents should be charged to the cost of production does not work well when applied to common carriers who have their rates fixed by bodies over which they have no control, particularly when such bodies insist on keeping the rate at 5 cents regardless of the actual cost of transportation.

The constitutionality of workmen's compensation has been settled by the highest court. The law is here to stay. There is only one way to avoid all the burdens of compensation and that is to avoid the accident in the first instance. Consider the question in a twofold sense, compensation and prevention.

The New York act permits the burden of compensation to be carried in four different ways; the best is self-insurance. Under self-insurance you pay exactly what accidents cost under the law. The avoidance of accidents will relieve you from payments.

ACCIDENT PREVENTION WORK NEEDED

Accident prevention of every kind brings its reward, not only in reducing human suffering but in decreasing costs for the carrier. The nearer perfection the equipment of the plant for the avoidance of accidents is, the less will be the cost of compensation. A strict compliance with the law regulating shops and factories will obviate accidents from antiquated and unguarded machinery.

Accident prevention is not an experiment. Practically every one knows today of the common methods used to prevent accidents. But, because they are known, they should not be discarded on the principle that familiarity breeds contempt. The placards containing the numerous "Don'ts," "Safety First," cards, lectures, inspectors who inspect, welfare workers, all have their place in this crusade. After the accident the first-aid man with the first-aid kit in readiness, the company doctors, company nurses, proper hospital arrangements, are all necessary.

Granting that all this is done there is still something of vital importance which should receive attention. If it has ever been your experience to attend at one of the several hearing rooms in New York, where compensation awards are made, you must have been impressed with the low degree of intelligence possessed by the applicants for compensation. It would seem to demonstrate that employees who injure themselves are of a low degree of mentality. They frequently not only injure themselves but also other employees of intelligence. Is it not a fact that sufficient attention is not given in the selection of the man to fit the job?

MORE CARE NEEDED IN ENGAGING EMPLOYEES

Employers do not give to their employing agencies sufficient thought. The man who is delegated to interview and employ applicants for positions should be of a high order of intelligence, knowing human nature and the requirements of the positions to be filled—such a man as could fill the position of general manager and whose qualifications would justify a commensurate salary. Such an employing agency would fill positions with men who would comprehend the dangers and necessities of their work with the result that there would be fewer accidents, greater efficiency in production, and less compensation to be paid.

In conjunction with such an employing agency we should have a qualified surgeon to examine applicants and pass upon their physical fitness to perform the work required; to learn if they are suffering from any occupational diseases with which the compensation act is now burdened, also to learn if they are suffering from any disabilities which the work they are required to do might aggravate, as the commission and courts hold that the employer must pay if such aggravation occurs.

When we have secured the ideal force, the superintendents and foremen should receive attention as a matter of prime importance. The foreman of today should be something more than a mere "driver." He should have intelligence, human instincts, and a perfect knowledge of the work to be done, so that inspiration and guidance will follow from his supervision. With such a foreman and force the known systems for the prevention of accidents would be effective, as the men would be sufficiently intelligent to understand and appreciate their merit.

It is true that in this country it is difficult to find men who will settle down and strive to become expert in their various lines. This difficulty, I believe, is due in a large measure to the union card which permits the slovenly and inefficient to fill the positions and receive the pay of the careful and skilled mechanic. When organized labor gives the same thought to the vices within its institution that it does to increasing its powers and perquisites by legislation, a new era will have arrived which will see the improvement of the laboring man. Until such time every effort should be made to select only the best.

The Utilities and the Public*

Best Interests of Both Are Common—The Pertinent Aspects of Public Regulation Are Set Forth with Impressive Clarity

BY ARTHUR W. BRADY
President Union Traction Company of Indiana, Anderson, Ind.

THAT which distinguishes public utility businesses from other businesses is their relations to the public. The manufacturer or the merchant, the farmer or the laborer, can pick his customers at will. He can, generally speaking, deal with one and refuse to deal with another. He can charge one customer one price and another a lower or a higher price, or no price at all. The amount and the quality of his product are determined not by rule of law, but by his own wishes, ability and business sagacity.

Not so with a public utility. Its every step is compelled by legal requirements or limited by legal restrictions. It has no option in the selection of customers, but must deal with all that offer, provided they fall within such reasonable classifications as may be established. It can make no differences between customers of the same class, but must treat all alike in matters of price and service. It cannot, as a rule, give its service or commodity away. It cannot even exchange that service or commodity for the services or commodities of others, but must sell for money, the universal standard of value. Its charges must be reasonable and just. It may not itself determine the amount and character of service and commodity which it shall furnish, but must conform to legal standards of adequacy and quality. As the Indiana utility commission act puts it:

> Every public utility is required to furnish reasonably adequate service and facilities. The charge made by any public utility for any service rendered or to be rendered either directly or in connection therewith shall be reasonable and just, and every unjust or unreasonable charge for such service is prohibited and declared unlawful.

Among the public utilities, using that term in its common acceptance and not in the restricted sense of the Indiana statutes, are comprehended the great transportation systems of the country, the street and interurban railways, the telephone and telegraph companies, the concerns which generate and distribute electric current for light and power, the gas and water companies and a number of other callings of a quasi-public nature. It would be difficult to exaggerate the importance of these agencies in modern life. Of those which deal with the intercommunication of men, Macaulay has spoken in often quoted words:

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*Abstract of paper presented before Indiana Public Utilities Association, Bloomington, Ind., Jan. 14, 1922.

> Of all inventions, the alphabet and the printing press alone excepted, those inventions which abridge distance have done most for the civilization of our species. Every improvement of the means of locomotion benefits mankind morally and intellectually as well as materially, and not only facilitates the interchange of the various productions of nature and art, but tends to remove national and provincial antipathies, and to bind together all the branches of the great human family.

Invested in the utilities are many hundreds of millions of dollars, representing a large part of the accumulated wealth of the country. Their securities constitute a great share of the reserves of the savings institutions, the insurance companies, the trust companies and the banks of the United States. An illustration is found in the fact that according to the Comptroller of the Currency 70 per cent of the capital of the national banks was represented two or three years ago by such securities. Furthermore, so interwoven with our industrial and social system have these utilities become that their failure to keep pace in expansion of their facilities with the growth of population and industry would seriously retard and handicap the development of the country. Expansion, however, requires new capital in huge amounts, and capital cannot be obtained unless assured reasonable safety and fair treatment.

The facts thus briefly reviewed indicate the closeness and the importance of the relations between the public utilities and the public. So closely interknit are they that unless these relations be just and harmonious both the utility and the public will suffer.

In order to insure the proper performance by the utilities of their duties to the public, systems of governmental regulation have been established on a large scale. Originally regulation was administered by charter or municipal franchise provisions, or by legislative enactment. As the country grew and prospered, the magnitude and intricacy of the problems involved became such that during the past half century, and especially during the past twenty years, the system of regulation through a commission, authorized by the Legislature and appointed by the chief Executive, has become practically universal throughout the United States. These commissions are invested with extensive authority, the legislatures having as a rule delegated to them practically all their powers with respect to the establishment of rates, the requirement of adequate service and facilities, and the prevention of discriminations.

Objection is heard from time to time that these commissions, which represent the state as a whole and not separate communities, invade the right of local self-government, and threats of abolishment are made. It is worthy of remark that the development over a long period has been in the contrary direction. So great are the public advantages derived from the commission form of control that no state having once adopted it has returned to the former system of regulation by act of the legislature or by municipal control, or by a combination of the two. It may be accepted as an established fact that the commission form of public utility regulation will never be permanently superseded by a system the deficiencies of which created the demand for present methods.

In Indiana, commission regulation began with the enactment in 1905 of legislation creating a railroad commission. That commission at first had jurisdiction only over steam railroads, but in 1907 its jurisdiction was extended to interurban railways. In 1913 the Shively-Spencer utility commission act was passed, and a new commission called the Public Service Commission of Indiana was created. The jurisdiction of the new commission embraces the steam railroads under the railroad commission act (which remains in force), the street and interurban railways, the telephone and telegraph companies, the heat, light, power, gas and water companies, and elevator and warehouse companies. Interurban railways enjoy the doubtful distinction of being regulated under either or both the railroad commission and utility commission acts.

Among the powers conferred on the Public Service Commission of Indiana by the Shively-Spencer act is that of controlling the sales, consolidations and other transfers to the utilities, their stock and bond and other security issues, and the creation of mortgage and other liens upon utility property. Control in such vital matters as these means that the property and financial affairs of every utility must be administered as the state, acting through its commission, commands.

THREE OBJECTS SOUGHT

The fact is sometimes overlooked that the elaborate regulatory machinery which the state has thus erected, with all its provisions for control of property and finances and for utility valuations, when judged from the public standpoint, has three objects, and only three, namely:

1. To insure reasonable and just charges by the utilities.
2. To require the furnishing of reasonably adequate service and facilities by the utilities.
3. To prevent unjust and unreasonable discriminations by the utilities.

When these objects are attained, the public needs are satisfied and the public rights are protected; but this is not all there is to utility regulation. A utility, also, has rights which must be respected and enforced. It has the right to demand that regulation shall not deprive it of the opportunity to earn a reasonable return on the fair value of its property. This right is not given by the legislature or even referred to in the commission acts. It is conferred by federal and state constitutions.

The mere observance and protection of this right is not, however, enough to meet public or corporate needs. If adequate service is given, if improvements are to be made, if a utility is to grow and develop, it must be accorded such treatment with respect to rates and practices that it may compete for capital in the money markets of the country on an equality with other businesses subject to like risks. Otherwise, capital cannot be procured and development is impossible. Investors cannot be driven to pour their funds into unprofitable channels.

The line between good regulation and bad regulation, whether judged from the public standpoint or the utility standpoint, is not the line between confiscation and non-confiscation; it is the line between the policy which stunts utility improvement and growth and the policy which encourages and promotes utility improvement and growth. In that growth and improvement the interest of public and utility are one. High public authority has declared that the eventual success or failure of any system of regulation depends on whether that regulation is such as to check or to induce the flow of capital into the utilities. The only finished utility is a dead utility, and a dead utility means a dead community. Every live utility is growing, or struggling to grow. The Massachusetts commission has presented the fact in these forcible words:

> It should never be forgotten that our public companies are not finished. They are in process; they are constantly calling for new capital, and of recent years in increasing amounts. They must be kept on good trading terms with the investing public or the whole experiment of private ownership and public regulation of these public utilities companies will fail. It is as necessary to attract capital into the public service as it is to prevent the mismanagement of these companies or extortion by them. If regulation is to limit (as it should) the profits of stockholders to a moderate return, not greatly in excess of an investment rate, regulation must also protect, so far as it reasonably may, all investments honestly and prudently made and properly managed in the public service; otherwise there will be no such investments. It is entirely clear that in the long run the rate-paying public as well as the investing public will be best served if regulation makes as its fundamental guiding principle an attempt to protect investments honestly and prudently made and wisely managed. Any other theory involves essential injustice, tends to make the development of our public utility companies a speculation and not an investment, operates as a premium upon various kinds of fraud; invites into the public service undesirable manipulators instead of sound, level-headed business managers; makes every rate case an almost indeterminable and labyrinthine inquiry into values with endless conflicts between so-called experts.

The facts which I have thus presented are mere commonplaces to utility managers and to all students of the relations between utility and public. They must, however, be constantly borne in mind if any discussion of those relations be worth while. Good regulation benefits both public and utility. Poor regulation harms both. Good regulation depends not merely on the wisdom, knowledge, intentions and courage of the regulatory commission; it depends also upon the relations between the public and the utilities. If those relations are pleasant and harmonious, the pathway to good regulation has been smoothed and made easy. If strained and unhappy relations exist, the road of community, commission and utility will be rough and the stumbling places many. The greatest of all harmonizers is understanding. Says Solomon:

> Wisdom is the principal thing; therefore get wisdom, and with all thy getting, get understanding.

Utilities as a class are fair. They want only reasonable and just rates and want to furnish good service. The public wants to be fair, at least it does not want to be unfair, yet public and utility frequently clash because neither understands the position of the other.

In recent years we utility men have done much to present our problems and difficulties to the public, yet we have not done enough. Through the same period the public has learned much of our real situation, but it has not learned enough. It was once the common belief that every public utility was a source of great wealth, and many of the utility difficulties are due to that belief. Public knowledge of the true facts concerning railroad earnings, expenses and profits was gained only at the immense cost attendant upon governmental operation, a cost that the country will long continue to pay.

Let us see that the facts concerning the utilities are put fairly and fully before the public. There is nothing we are afraid to disclose. Full reports of our operations are, and for years have been, on file with the public Service Commission of Indiana, and in the case of some of us with the Interstate Commerce Commission also. Our records and properties have been examined and reported on time and again by expert public officials. The facts demonstrate the smallness of the margin upon which public utility business is done. Let the facts be known to the people, and let us convince the public that we are trying to do the best we can with the means at our disposal to furnish good service. There will then be little ground for complaint of the relations between the utilities and the public.

Budapest for the Next Convention

PRESIDENT SPANGLER of the Internationales Strassen und Kleinbahnverein has issued a notice that the second convention of that association will be held in Budapest in 1923. Meetings are held only every two years, and the last convention was held in Vienna, May 29 to June 8, 1921. The meeting in Budapest, it is hoped, will be held under somewhat better auspices as a longer time will be available for the preparation of reports. Members are requested to forward suggestions of questions they wish to be considered to the president, who is general manager of the Vienna Municipal Tramways.

The next meeting of the executive committee of the association will be held in Stuttgart, at the time of the meeting of the German Street Railway Association, when it is expected that a preliminary program will be drafted. The membership of the association now consists of 355 members, made up as follows: (a) regular company members (owning 371 roads), 254; (b) regular individual members, 43; (c) special company members, 37; (d) special individual members, 21.

New England Street Railway Club

THE February meeting of the New England Street Railway Club will be held Feb. 2 at the Copley Plaza Hotel, Boston, Mass. There will be no afternoon meeting. At the evening meeting there will be a report of the committee on the development of one-man car, motor bus and trackless trolley.

Dinner will be served at 6 p.m. Tickets are $2.50 each. The hotel management must be notified of reservations not later than Tuesday, Jan. 31.

American Institute of Electrical Engineers

THE midwinter convention of the American Institute of Electrical Engineers will be held in New York, Feb. 15-17. This is the first convention to be held under the new ruling of the board of directors which prescribes that four general technical meetings of the Institute be held each year. Technical sessions are arranged for Wednesday afternoon and evening, Thursday morning and afternoon, and Friday morning. On Thursday evening the Edison medal will be presented to C. C. Chesney, and Friday evening there will be the usual dinner dance.

Suggests Commissioner-General of Transportation

IN A RECENT report rendered to the Chamber of Commerce of the United States, its committee on railroads recommends that the Chamber of Commerce urge Congress to enact appropriate legislation authorizing the appointment of a special administrative officer with the title of commissioner-general of transportation, to hold office subject to the will of the president and at a compensation prescribed by the president.

The committee goes on to make several detailed recommendations with reference to the duties of this commissioner. Fundamentally, these resolve themselves into the suggestion that the commissioner should be selected because of his expertness, familiarity and experience in transportation conditions, that he should study and report to the president, that he should assist the Interstate Commerce Commission and should be entitled to be heard at all hearings before any board, commission, bureau or other governmental agency in all cases involving transportation rates, fares, regulation of terminal charges, wages, working conditions, or other subject matter affecting interstate transportation, and that he should be authorized to call on any department of the government for any information as to interstate transportation matters.

Most important, however, is the recommendation that "he should be authorized to grant federal charters to corporations proposing to engage in interstate transportation by land, water, or air, and upon application therefor, to convert state corporations so engaged into federal corporations, so that by such conversion the existing corporation shall not close or interrupt its business as a common carrier."

This report will be considered by the National Council of the Chamber of Commerce at its meeting to be held in Washington, D. C., on Feb. 8 and 9.

The committee on railroads, making this recommendation, consists of George A. Post, chairman; Walter S. Dickey, F. C. Dillard, Emory R. Johnson, Charles E. Lee, Thomas C. Powell, Wilmer W. Salmon, George W. Simmons, Alexander W. Smith, Harry A. Wheeler.

Electric Railways Help Realty Values

IN AN address delivered by Guy W. Wolf, Research Department, California Real Estate Association, before the annual meeting of that association Jan. 19, he showed that property values are dependent largely on transportation facilities. He pointed out that realty men had a direct interest in the maintenance of good transportation facilities and urged them to exercise their influence to help produce a reasonable attitude toward the traction companies.

American Association News

1922 Convention Committee Appointed

PRESIDENT TODD has named the committee members listed below as the committee on exhibit and location of the 1922 convention of the association. This committee plans to make a preliminary survey to determine the consensus of opinion regarding exhibit and also location. It plans to report to the executive committee at Indianapolis on Monday, Feb. 27, and will probably hold a meeting on Sunday, Feb. 26, at Indianapolis.

Those who have ideas as to the nature of the convention which should be held—exhibit or no exhibit—and as to the best place should communicate their ideas to the chairman, J. J. Stanley.

The names of the committee follow: J. J. Stanley, Cleveland Railway, Cleveland, Ohio, chairman; H. H. Adams, Chicago Surface Lines, Chicago, Ill.; George O. A. Barnes, Galena Signal Oil Company, New York, N. Y.; Luke Bradley, Stone & Webster, Inc., Houston, Tex.; F. G. Buffe, Kansas City Railway, Kansas City, Mo.; T. W. Casey, National Pneumatic Company, New York, N. Y.; R. E. Danforth, Public Service Railway, Newark, N. J.; F. H. Gale, General Electric Company, Schenectady, N. Y.; Edward M. Graham, Bangor Railway & Electric Company, Bangor, Maine; W. F. Ham, Washington Railway & Electric Company, Washington, D. C.; H. Kenfield, *Electric Traction*, Chicago, Ill.; George R. Lyman, William Wharton, Jr., & Company, New York, N. Y.; J. C. McQuiston, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.; C. E. Morgan, Brooklyn City Railroad, Brooklyn, N. Y.; E. B. Meissner, St. Louis Car Company, St. Louis, Mo.; H. H. Norris, ELECTRIC RAILWAY JOURNAL, New York, N. Y.; D. E. Parsons, East St. Louis and Suburban Railway, East St. Louis, Mo.; A. M. Robinson, J. G. Brill Company, Philadelphia, Pa.; J. S. Thompson, American Brake Shoe & Foundry Company, New York, N. Y.; B. E. Tilton, New York State Railways, Syracuse, N. Y.; William Von Phul, Market Street Railway, San Francisco, Cal.

Resolutions on the Death of W. Caryl Ely and Henry J. Davies

AT THE meeting of the executive committee of the American Association on Jan. 20 the following resolutions were unanimously adopted:

RESOLUTION ON THE DEATH OF W. CARYL ELY

Whereas, W. Caryl Ely from 1903 to 1906 was president of what is now the American Electric Railway Association, and during those years took the leading part in reorganizing the association and laying the foundation for the present organization, and gave unstintingly of his time to the preparation of an enduring constitution and in securing for it the support of the members at large; and

Whereas, not only while president, but at all other times since he has been connected with the association, he has taken a great interest in its affairs and has always been ready with his wise counsel and his broad legal knowledge to assist the organization in its many ways; and

Whereas, through his personal charm, lovable nature and sterling character he has both endeared himself to a very wide circle in the electric railway business and won their highest respect; now, therefore be it

Resolved, That the officers and the executive committee of the American Electric Railway Association place on record the great loss to the electric railway industry and to the association and to the members of the association individually caused by the death of Mr. Ely; and, be it further

Resolved, That they take this means of testifying to the great regard, affection and esteem in which he was held in the electric railway industry, in which he spent so considerable part of his life, and, be it further

Resolved, That these resolutions be spread upon the minutes of the committee and a copy be sent to his immediate family.

RESOLUTION ON THE DEATH OF HENRY J. DAVIES

Resolved, That the executive committee of the American Electric Railway Association by this minute records its profound sorrow at the death of Henry J. Davies. To Mr. Davies was largely due the inception, organization and continuing usefulness of the American Electric Railway Accountants' Association. The industry is indebted to him for valuable and farseeing efforts in the perfection and stabilization of electric railway accounting methods. As a member of many of the association's committees, he performed marked service for the industry and for this organization. A clear thinker, a patient student, a wise counsellor, a sterling gentleman, a faithful friend, in the death of Henry J. Davies the industry loses an able executive, the association a valued member, while his co-workers in the field mourn a trusted and beloved companion.

The secretary is instructed to spread this resolution upon the minutes of the committee and to convey a copy thereof to the family of the deceased.

Executive Committee Recommends Individual Membership Modification

AT THE regular monthly meeting of the executive committee of the American Association, held in New York City, on Jan. 20, it was recommended to the membership that the following clause, in section IV, paragraph (c), relating to individual members, as adopted at the October, 1921, convention of the association and which reads as follows, shall be stricken out:

"Except that those eligible to election as defined in paragraph (b) and officers and employees of non-member companies shall not be eligible to election as individual members."

The committee had found that restrictions not anticipated by the original wording of that clause were keeping several useful individual members from retaining their place in the association's ranks. It was thought that the rest of the clause, which gave the executive committee the duty of admitting only those individual members who, in the committee's mind, would be useful members of the association, was a sufficient protection.

The proposed constitutional change will be voted on at the midyear meeting at Indianapolis on Feb. 28. If adopted, the executive committee will probably adopt a method of procedure which would make the committee on individual and company section membership practically a board of examiners for the applications for individual membership in the organization.

OTHER MATTERS CONSIDERED

The subjects and meetings committee reported the program for the Indianapolis meeting as being complete. In addition to the program as printed in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 31, page 1152, Chairman Emmons announced that Mrs. Antoinette Funk, lawyer and public speaker of Washington, D. C., would give an address at the midyear conference on "A Woman's Viewpoint of Electric Railway Service."

The committee on publicity reported as to the amount of newspaper space which had been devoted nationally to electric railway problems during the past month and also as to addresses by Labert St. Clair, director of the Department of Advertising, Bureau of Information and Service, at the Providence, R. I., section meeting, and at the Indiana Utilities Association meeting at Bloomington, Ind.

The membership committee reported a net increase of 559 to 564, with the following additions: Associate members—Republic Railway & Light Company, Republic Engineers, Inc., Electric Bond & Share Company, Illinois Traction Company; new operating member—Indiana, Columbus & Eastern Traction Company. There were also six new individual members.

Resolutions on the death of W. Caryl Ely and H. J. Davies were adopted as recommended by the respective committees.

On recommendation of the executive secretary, Mr. Welsh, and the president of the Engineering Association, Mr. Kimball, and of the finance committee, the executive committee authorized the executive secretary to add a special engineer to the staff. This is not so much an addition to the staff as it is the replacement of Mr. Welsh himself in his former position of special engineer.

On recommendation of the representatives on the joint committee of National Utility Associations, the executive committee authorized a contribution of $2,000 toward its expenses to continue the work under way.

President Todd announced the appointment of the exhibit and location committee for the annual convention in 1922. This committee is named elsewhere in these columns.

The next meeting of the executive committee will be held Feb. 27 at Indianapolis, the day preceding the midyear conference.

Those present at the meeting on Jan. 20 were: President R. I. Todd; Vice-Presidents B. I. Budd, C. D. Emmons and J. N. Shannahan; presidents of affiliated associations, C. S. Kimball and L. H. Palmer; operating members at large, H. E. Chubbuck, H. G. Bradlee and R. P. Stevens; manufacturer member, George Tontrup; Past-Presidents, A. N. Brady and L. S. Storrs and Executive Secretary J. W. Welsh.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Service Being Restored

Strike at Richmond Enters Second Week—Company Building New Personnel

The second week of the strike on the railway lines of the Virginia Railway & Power Company finds the company gradually restoring service with new men and with all efforts of the authorities to find a basis of arbitration so far unsuccessful.

General Manager Harvell said that there were forty-two cars in operation in Richmond on Jan. 24, while eighty-two were in operation in Norfolk. The men in Petersburg refused to go out. As the situation stands therefore service is normal in Petersburg, is approaching normal in Norfolk and is about forty per cent normal in Richmond. As for Portsmouth, no effort has as yet been made to resume service there. Service on the Richmond-Petersburg Interurban line has been partly resumed.

The strikers continue their orderly attitude and have given the police little trouble. Many of the old men are running jitneys and others are acting as jitney starters at important corners, assisting passengers into motor cars and seeing that they are properly directed.

Company Rebuilding for Future

About 300 jitneys are in operation and hundreds of private cars which make no regular charge and going up and down the streets with placards inviting people to ride free rather than patronize the street cars.

Pressure is being brought on the company by the municipal authorities of both Richmond and Norfolk to arbitrate. President Wheelwright has several times agreed to arbitrate wages provided the same arbitrators were empowered to arbitrate fares, thus settling the problems of the income and the outgo. Without some provision made to raise the money, Mr. Wheelwright has declined to enter into an arbitration on the question of wages alone. In Norfolk it is proposed to make the small one-branch Council the arbitrators. Richmond still has the old-fashioned two-branch Council of thirty-two members.

The Richmond City Council has in fact adopted resolutions demanding arbitration. It holds over the head of the company the threat that if it does not consent to arbitration, the Council will revoke the 6-cent fare privilege granted more than a year ago, and require the company to revert to the fares named in the franchise—six tickets for a quarter and two tickets for 5 cents before 7 a.m. Since the company has complained of a large falling off in the number of persons riding in the last year, while the population of the city has increased, a number of councilmen hold to the belief that the company would in the long run be better off with a 5-cent fare than with the present 6-cent fare. The company asked forty-eight hours in which to reply to the ultimatum of the City Council.

On Jan. 22 fifty men were brought to Richmond through a labor agency from the North. The company avoided employing the term strike-breakers in its statement regarding its use of these men, but it is admitted that they are experienced men. On Monday these men refused to work unless allowed to operate in pairs. General Manager Harvell insisted that all of the imported men go out as motormen, each with a conductor who was a local man and knew the run and the city. The men refused to work under these conditions, and after some palaver were summarily discharged.

No further efforts, it was stated on Jan. 24, would be made to obtain strike breakers, but every day the company is taking on men, many of whom have in past years had street car experience here or elsewhere, though it is admitted that there have been few if any desertions from the union ranks. Each day an additional number of cars is in operation and the company promised for Jan. 25 a service on all lines at least 50 per cent normal, with the reopening of several suburban lines which have been without service since the strike began.

The company will have nothing further to do with the strikers. It says that they have now been discharged. If there is to be any arbitration or change in the wage scale, the company officials assert it will be by agreement with the men now working—not with those who quit their posts to go on strike and who have since been formally discharged. The unionizing of the system, the company asserts, it will not consent to under any circumstances.

The company on the night of Jan. 25 again declined the demand of the City Council of Richmond for arbitration of the issues involved in the strike. As stated previously the Council on Jan. 23 threatened that unless the company consented to arbitrate the city would force a return to the 5-cent fare. With this in mind both branches of the Council met on Jan. 25. The Common Council promptly adopted a repeal of the present 6-cent fare but the Board of Aldermen later refused to suspend its rules to consider the matter and then referred the question to committee.

The Council also failed to adopt an ordinance reducing the jitney license so as to open the streets to motor cars operated by strikers in competition with street cars.

$5,500,000 Valuation Fixed

Grand Rapids Valuation Decision Ends Long Dispute—Franchise Election Next September

A valuation of $5,500,000 has been agreed upon between officials of the Grand Rapids (Mich.) Railway and the City Commission for the property of the railway. The company will receive a thirty-year franchise, with a return of 8 per cent on the new valuation. A revaluation will be made after five years, the 8 per cent return remaining in effect. Until the election on the franchise on Sept. 12 the company will operate under the new agreement. The commission is now drafting the franchise to be presented to the voters. It is to be based on the service-at-cost plan.

The resolution on the railway valuation presented to the City Commission by the special committee is as follows:

> The offer of the company, file No. 12762, of a valuation of $5,650,000, coupled with a thirty-year franchise without revaluation, was not considered favorably by your committee, and the counter offer of $5,500,000 subject to revaluation at the end of each five-year period at the request of either party, was finally agreed to by the committee.
>
> As a result we recommend that the value of the property used and useful in connection with the utility, as included in the appraisal of Oct. 31, 1920, plus additions to the property subsequent to that date, be fixed at the sum of $5,500,000 as of this date. This value, however, to be subject to revaluation at the end of each five-year period at the instance of either party.
>
> We feel that we have done all we can in the premises and that this is the lowest valuation that will be given consideration by the company, and we believe that the people are entitled to have a franchise submitted to them.

Negotiations between company officials and the City Commission have been carried on for more than a year. The city at first placed the valuation at $5,076,000, while the company insisted on a figure of $6,500,000. This amount it later reduced to $6,270,000. In August L. J. DeLamarter, manager of the railway, stated that a valuation of $7,000,000 with an 8½ per cent return was the best valuation for all concerned. When negotiations were started, a committee of engineers representing both the city and the company had agreed upon a historic valuation without depreciation of $4,468,360, to which was added material and supplies account of $131,812 and a working capital of $107,040. The five-year valuation, from 1915 to 1919, without depreciation, was placed at $6,718,463. With material and supplies and working capital the total was $7,509,992. The reproduction valuation inclusive was set at $10,591,414.

In previous issues of the Electric Railway Journal in which the Grand Rapids dispute has been discussed it has been pointed out that the franchise there expired on April 23, 1921.

Commission Defends Decision

California Body Declares Return Provided Pacific Electric Is Less Than Fair Rate—Defends Its Decision Against Public Attack

Since the California State Railroad Commission of Dec. 24, 1921, granted an increase in passenger rates on Pacific Electric Lines, effective Jan. 1, 1922, certain communities have opposed the increases by attacking the Railroad Commission through the press and community mass meetings. Claims were made that the commission's report on the affairs of the company did not take into account alleged extravagance and enormous salaries paid to its officials by the railway, nor did the reports fully consider the company's financial condition.

A REHEARING was set for Jan. 24 in Los Angeles as asked by the Hollywood Chamber of Commerce and other communities. The Hollywood Chamber of Commerce has engaged Paul Ost, assistant engineer of the San Francisco Municipal Street Railway lines, to prepare a report on the commission's costs of operating the Pacific Electric Lines. Mr. Ost is attempting to compare service at cost of the San Francisco Municipal Lines against the figures of the commission. The commission on Jan. 17 denied the other communities permission to extend the date of the hearing, but stated it is probable that the Hollywood protest will be extended.

The commission in defending its decision against the public attack issued a statement on Jan. 17 justifying the increase in passenger fares on the Pacific Electric lines and pleading for the public to get a real understanding of all matters pertaining to the case.

The commission's statement is in part as follows:

The underlying principles of rate making are simple enough, and so far as we know are denied by nobody. Certain misconceptions regarding them are very prevalent, however. One is that the commission allows for whatever expenses are actually incurred in operating, regardless of extravagance or economy. The exact reverse is the case. The other is that the commission "guarantees," or at least undertakes to assure, dividends on stock, "watered" or otherwise. The fact is that in rate making capitalization is not a factor. If a fair return, figured not on the capitalization but on the actual property used and useful in the business, will pay interest and dividends these may of course be paid, but if the financial structure is such that this cannot be done, the commission does not understake to meet this condition. Even a fair return on the property itself is not guaranteed, and in many cases cannot be obtained. In this case, for instance, the return provided is less than a fair return on the valuation of the property and will not make possible, and is not intended to make possible, any dividends whatever to the stockholders.

The continuance of the service of the Pacific Electric Railway and its extension and improvement are vital to the prosperity of Southern California. The Pacific Electric carries 274,088 passengers each day and is the third largest freight carrier in California, being outranked only by the Southern Pacific and the Santa Fé. There is no substitute for this service. For it to stop suddenly or decline gradually would be a calamity quite as disastrous to the people as to the owners. Not only its patrons but the whole business of Los Angeles would suffer.

It is a common but dangerous error to assume that the continuance of this service is a matter of course. It is not. No public service, whether privately or publicly owned whether under governmental regulation or unrestrained private initiative, can continue permanently to spend money which it does not from some source receive, nor can it invest money which it has no means of obtaining. Under public ownership, to be sure, deficits can be taken from the people compulsorily in taxes which they decline to pay voluntarily in rates, but under private ownership a company rendering service has no source of income except the ratepayers and no source of capital except the investing public. Under either system the necessary cost of the service is paid by the people or the service ceases to be rendered. Unless the commission is to prevent the companies under its jurisdiction from rendering service and securing capital, it must fix rates which will provide three things: Income to pay operating expenses or the service cannot operate; a depreciation fund or the property will disappear, and a return on the investment, or investments will not be made. The problem of the commission is to ascertain what rates will meet these conditions, if reasonable rates will do so, and to determine a just distribution of these rates among the groups of ratepayers.

In this case, since June, 1920, a corps of expert engineers has been at work upon the valuation, the accounting, the financing and the service conditions of the company. The first-hand ascertainment of facts was exhaustive and the check of the company's figures searching.

The reports of these engineers, covering many thousands of pages, have been critically analyzed and cross-examined at many and long continued hearings, at which the company, the cities and the commission were represented. Any statement of fact which was questioned or challenged has been critically re-examined, with its supporting data, and no conclusion of fact has been reached which did not meet all these tasks. The statements here given are, therefore, not to be met by superficial and uncertain generalizations from a few imperfectly known facts. They are based on exact and exhaustive knowledge.

COMMISSION KNOWS IT KNOWS

The commission knows exactly what the present service costs, where every dollar paid by the company goes, whether for labor, material, power, taxes or other charges. It knows exactly that in 1920 the company had an income of $15,346,346. It knows that not only was all of this money spent in the operations of the company in that year, but that the Southern Pacific Company (owners of the Pacific Electric Railway), in addition, assumed a deficit of $1,158,045. We estimate, not by guesswork but by methods of long-tested soundness, that the rates fixed and the service ordered in the recent decision will produce an annual income of slightly over $17,000,000. And we know, with reasonable certainty, what use will be made of this income in 1922 and following years. More than 60 per cent of the operating expenses will go for wages. The salaries of all the general officers aggregate $38,992.

The cost of electric power amounts to more than 10 per cent of operating expenses, while repairs cost normally about $3,000 000 and taxes will be from $700,000 to $800.000. These operating costs amount altogether to about $13,000,000 which does not include interest on bonds or borrowed money, expense for extensions and improvements or for unforeseen losses.

In fixing rates the commission was guided by certain fundamental considerations. No change was made in freight rates, and hence this discussion is confined to passenger service. The Pacific Electric gives two distinct kinds of passenger service—interurban and local street car service.

The rate-fixing principles guiding the commission may be summarized as follows:

1. A distinct local service should earn at least the bare cost of operation, disregarding profit entirely.
2. The distance of the ride has a bearing on its cost.

As to the first principle, it was established without a question of doubt that the company's street car service practically everywhere was operated at a loss and that the tendency was to place the loss upon the interurban passengers. It follows that unless local systems can be placed on a self-sustaining basis they must be abandoned. Secondly, as to distance, the commission found that in Los Angeles the loss was caused mainly by the great distance the average passenger has to be carried. Obviously, to carry a passenger 10 miles costs more than to carry him a mile. This is the reason for the zone system. The question here, of course, was where to draw the line. It would be neither practical nor good public policy to charge a different fare for each additional mile. In determining the zone discretion and common sense had to be used.

In all zoning there is bound to be a fringe district of apparent unfairness. But the proper test of the reasonableness of the fare is the average distance of travel within the zone. After giving full consideration to these circumstances the zones were established in Los Angeles with regard for the needs and convenience of the public. Even with the zone rates the Los Angeles service barely justifies continuance.

In conclusion the commission states that while automobiles, private and public, have cut the passenger revenue, the automobile has not yet, if it ever will, become a substitute for electric local and interurban railways. The decision of the commission, the statement points out, calls for three big things: The improvement of the Pacific Electric system and service, equality of cities based on geographical position and progress toward the inauguration of a universal transfer system.

Full Statement of Detroit Matters to Be Made at Annual Meeting

A. J. Ferguson, vice-president of the Detroit (Mich.) United Railway, was interviewed by the Montreal *Gazette* on his return to that city on Jan. 17 about the affairs of the railway. Mr. Ferguson, who represents the Canadian interests in the company, stated that the telegraphed reports of the events that had surrounded the meeting in Detroit had been misleading and apparently made with only a superficial knowledge of the situation. After quoting Mr. Ferguson with respect to the history of the early negotiations at Detroit the *Gazette* said:

The recent reports, Mr. Ferguson stated, were misleading in another important particular, in that it was erroneously stated that Mayor Couzens had offered $20,000,000 for the property; neither was it true that the property for which this offer was supposed to have been made included all the property, of which the electors by their vote in 1919 declined to sanction the purchase for $31,500,000.

Mr. Ferguson went on to state that the shareholders of the company were being circularized in the above connection and that they will have placed before them a full and complete explanation of the situation at the forthcoming annual meeting, which takes place on Feb. 7. Mr. Ferguson declined to discuss the reasons for the failure of the company and the city to come together in the recent negotiations, but stated that when they were known at the time of the annual meeting, the whole matter would be cleared up.

Published statements of the company's trackage make it clear that after the company has disposed of its city lines, which amount to about 300 miles of track, it will still operate some 600 miles of suburban roads which radiate around Detroit, connecting with 100 towns and villages and passing through 160 different municipalities.

It is generally stated, too, that the company's net earning capacity has greatly improved during recent months by reductions in labor, coal and other costs. The company's power is steam generated and it is understood that the cut in coal prices since the time prices were at their peak now amounts to a saving of about $5 000 a day.

A cut in wages was made some time ago and there is already talk of another reduction in this connection.

Trackless Trolley Franchise Is Sought in Milwaukee, Wis.

An ordinance was introduced in Council on Jan. 9 granting the Milwaukee Electric Railway & Light Company the right to install and operate as a part of its railway system trackless trolley busses on Lincoln Avenue from Clinton Street to Twenty-seventh Avenue. The company is authorized to extend its existing street railway system by extending its trolley wires in a manner suitable for the operation of "electric trolley street cars operated without rails directly on the surface of the street for the carrying of passengers," with all necessary or convenient poles for the support of trolley span wires.

The ordinance provides that the company shall not be subject to the obligation to pave or repair the paving on the street on which it is proposed to render the trackless trolley bus service. This section may arouse the opposition of certain city officials, though the ordinance was introduced as a result of favorable action by a number of civic organizations which favor the operation of the trackless trolley service.

STEEL STACK IN TRENTON BLOWN DOWN DURING STORM

As reported in ELECTRIC RAILWAY JOURNAL of Jan. 7, 1922, page 57, the company has taken the position that if permission is granted for the operation of the service, it will undertake to furnish it as a substitute for rail service which the high costs and lack of assurance of sufficient traffic to support a rail line have made it unable to render.

Proposed Electric Interurban Being Fostered

Promotion of an electric interurban line along the Texas-Mexican border from Brownsville, near the mouth of the Rio Grande, to Del Rio, about 300 miles up the river, is being undertaken by Northern and Eastern capitalists. Large land owners who would be benefited are back of the project and it is reported that they are willing to undertake the greater part of the financing.

The line would follow the course of the Rio Grande for the greater part of the way, and engineers who have made preliminary surveys, say that water power developed on the river would be adequate for the operation of the line, and would also generate power for whatever development might follow in the agricultural and industrial centers thus created.

Storm Cuts Down Steel Stack

During the heavy wind and snow storm of Jan. 11 the 125-ft. steel stack on the Lincoln Avenue power plant of the Trenton & Mercer County Traction Corporation, Trenton, N. J., was blown down. It crashed through the boiler room, breaking connections with the main feed lines. This caused a suspension of the traffic on all the city and suburban lines of the company for some time, and the corporation had to borrow power from the Public Service Railway lines. A new stack is now being built. The New Jersey & Pennsylvania Traction Company and the Public Service Railway also suffered delays by falling wires and poles.

Seattle Wage Dispute Adjusted

The tangle in adjusting the salaries of trainmen of the Seattle (Wash.) Municipal Railway, resulting from changing the rate of pay to a monthly basis, has finally been worked out by the City Council and the new scale announced. The railway trainmen had heretofore been grouped in three classes, and under the new salary ordinance are grouped in four classes, thus causing new confusion.

A resolution was finally adopted providing that all trainmen entering the railway service on or after Jan. 1 1922, shall receive $135 a month; those who received $4.75 before Jan. 1, 1922, shall receive $145 a month; while the $5 and $5.25 a day men shall receive $150 and $155 a month respectively. Time and a half for overtime will continue to be paid the trainmen.

Report Presented on $5,655,000 Project

Extension of the Dorchester tunnel beyond Andrew Square and the electrification of the Shawmut branch of the New York, New Haven & Hartford Railroad, for the purpose of creating a rapid transit system in the Dorchester district, near Boston, at an estimated cost of $5,665,000, is planned in detail in a report filed in the Legislature by the Public Utilities Commission and the Boston Transit Commission, acting jointly. These two bodies were directed to study the proposition, which was first suggested by Charles A. Ufford of Dorchester, and report back to the General Court, under an act passed at the last session.

The plan, in brief, provides for taking over the Shawmut branch of the New York, New Haven & Hartford Railroad, running the present Dorchester tunnel trains along the Shawmut branch roadbed to Fields Corner and using high-speed trolleys on the Shawmut branch tracks beyond Mattapan Square. Under this plan passengers would transfer from the tunnel trains to the surface cars at Fields Corner station of the Shawmut branch. The station would be rebuilt and extensively enlarged.

The trustees of the Boston Elevated Railway, the report continues, are ready to proceed with the plan, while the New Haven Railroad officials have said they are willing to co-operate to the best of their ability. Concluding, the report says:

> The plan has been extensively studied, and it is felt that it will coördinate with any future extensions which we can foresee and that it itself is worthy of immediate adoption, if financially practicable, as a large step forward in the right direction. Further extension of this or similar plans may well await the results of accumulated experience

The plan for carrying out the project depends, of course, on the ability to secure the funds necessary to finance the undertaking.

Railway to Care for Disabled

A plan to provide for all employees who, because of age or disability, may be unable to continue in active work has just been announced by the Georgia Railway & Power Company, Atlanta, Ga. The plan is effective from Jan. 1, 1922, being divided into four separate classes as to beneficiaries as follows:

> Class A—All employees in the service of the company for thirty consecutive years will be permanently retired upon reaching the age of 60, receiving annually from the company a sum equivalent to 30 per cent of their earnings the twelve-month period previous to retirement.
>
> Class B—Employees in service twenty-five consecutive years retired on reaching 60 and receive a sum equal to 27½ per cent of earnings last year before retirement.
>
> Class C—Employees in service twenty consecutive years retired on reaching 60 and receive a sum equal to 25 per cent of earnings last year before retirement.
>
> Class D—All employees in the service of the company for fifteen consecutive years who become totally disabled for any reason, other than self-inflicted, or by injury arising in the course of their employment, shall be retired by the company and receive a yearly sum equal to 25 per cent of their earnings the twelve-month period before retirement.

Changes in New York State Taxes Urged

A joint legislative committee in New York, which has been studying the taxation of utilities for some time, made its report to the Legislature on Jan. 26. It says, in part:

> The present system of taxing these corporations in the State is a chaos of intricacy and complexity. The staff of the committee has reduced these complicated taxes to a basis which makes possible a comparison with the taxes paid by other business interests. The grossest inequalities come to light. Many of the companies, particularly some of the electric railway companies which are bound by a fixed low rate of fare have been literally taxed into bankruptcy. Based on net income, the business taxes on electric railways are nearly four times as great as the corresponding taxes on manufacturing corporations. If local real estate taxes are taken into account, electric railways pay over 38 per cent of their net income in taxes. This is nearly five times the tax paid altogether by manufacturing companies, for example.
>
> Not all the public utilities are so unfavorably situated, because some have been more successful in their efforts to shift their burdens to the consumer through increased rates. Every class of public utility, however, pays heavier taxes than either manufacturing or financial institutions.
>
> As an immediate means of improvement, the committee recommends that the entire series of complicated State taxes on public utilities be at once abandoned, with the exception of the special franchise tax which cannot be immediately abandoned for the reason stated above; and that in substitution therefore a "gross net" tax be established, against which special franchise taxes, pending the passage of the constitutional amendment, may be used as an offset. It is contemplated that the real estate of public utility corporations, closely defined, shall continue to be taxed locally.

A more extended abstract of this report will be published next week.

Parallel Case Noted in San Francisco on Eve of Seattle Suit

On the eve of their suit to prevent the city of Seattle, Wash., from using general tax funds for the operation of the Municipal Street Railway, the "fourteen taxpayers" scored another victory, when the Circuit Court of Appeals at San Francisco denied the Puget Sound Power & Light Company a rehearing of its suit to prevent the taxpayers from proceeding with the other action in the Superior Court of King County. Thus, the last barrier against the progress of the suit was removed, and it has been docketed for trial Jan. 17.

The refusal to grant a rehearing of the power company's injunction proceedings followed a decision in the Circuit Court of Appeals of San Francisco on Dec. 5, in which the jurisdiction of the Superior Court of King County, questioned by the Stone & Webster interests, was upheld. The traction company maintained that jurisdiction lay in the federal and not the state tribunals. After that decision was given by the Circuit Court, the traction company sought a rehearing of the case, which was refused.

Attorneys for the "fourteen taxpayers" declare that the recent decision confirms the position taken by the taxpayers that the traction company was not a party to the action. James B. Howe, attorney for the traction company announces that an application for appeal from the decision of the Circuit Court will be made to the Supreme Court of the United States. This, however, will not delay the case, for which trial is set for Jan. 17.

Boosts Oregon Development Plans

Development plans of the Portland Railway, Light & Power Company, Portland, Ore., are told in a three-quarter page display in the New Year's edition of the *Morning Oregonian*. The proposed construction is called the Three Links project and will extend over a period of approximately three years. The company has worked out the preliminary plans for the extensive building whereby the water flowing into the Clackamas River can be utilize The work will be done in four units. The preliminary step is the building of a road for the carrying of materials required in the actual construction of a diversion dam about 4 miles above the mouth of Oak Grove fork; the building of the 8½ mile conduit; a twenty-seven 500-hp. water wheel, and the building of a transmission line.

The remaining steps consist of the construction of a 70-ft. dam on the Oak Grove fork, the construction of tunnel through Oak Grove butte to convey the water to the fork and of a low diversion dam. The final step in the plan is the replacement of the low diversion dam mentioned above with a 130-ft. earth-fill dam to form a reservoir. This reservoir would be 3½ miles in length.

The article is well illustrated with four cuts showing the development of the Clackamas River.

Railroad Legislation Opposed in Present Form

The Chamber of Commerce of the United States is preparing to oppose vigorously any movement that may be made in the coming session of Congress to repeal provisions of the transportation act which authorizes the Interstate Commerce Commission to make rates to provide adequate revenue for the railroads and to regulate intrastate rates. The position of the national chamber is that these provisions of the act should not be repealed until they have had a fair test.

In a communication sent out recently to the constituents of the chember Joseph H. Defrees, president, said that enactment of the proposed legislation would repeal those sections of the transportation act by which the Interstate Commerce Commission is directed to establish rates that are reasonably adequate to the railways and just to the public. According to Mr. Defrees, rate regulation will return to the chaotic condition which existed for many years because of the conflict of authority between the Interstate Commerce Commission and the forty-eight state commissions if the Interstate Commerce Commission is deprived of all authority to regulate intrastate rates as proposed in the Capper bill.

News Notes

Inspectors of Safety Appliances Notes.—The United States Civil Service Commission has announced open competitive examinations for inspection of safety appliances and inspector of hours of service. The examination will be held on March 22 and 23.

99 Per Cent of Year's Trips on Time.—Of 509,658 trips made by cars of the Spokane & Eastern Railway & Power Company, Spokane, Wash., during 1921, more than 99 per cent were made on time. More than half of the belated and lost trips were due to causes which were not under control of the company. Parades, the greatest single cause, and breakdowns of trucks and automobiles contributed to delays.

$570,162 Voted for Transit Needs.—An appropriation of $570,162 was recently voted by the Board of Estimate of New York City, N. Y., for the use of the Transit Commission. Of this amount $500,000 will be used for the requirements of 1922 and the remainder will meet the payroll expenses for the last two weeks in December, 1921. The appropriation was made following the decision of the Court of Appeals upholding the law under which the new Transit Commission in New York is now functioning.

Wants to Lease Lines.—The Mobile Light & Railway Company, Mobile, Ala., offered on Jan. 13 to rent its five branch lines for $1 a year, lessee to operate them steadily, give service equal to that now being furnished by the company, and also to furnish a substantial bond. Higher rates have been asked by the company of the Alabama Public Service Commission, the company claiming its monthly deficit approximates $7,000. The present fare is 7 cents. The offer to lease the lines was advertised by the company in the daily papers of Mobile.

Wants Interurban Line Established.—To prevent the scrapping of the Gainesville-Midland Railway in north Georgia an effort is being made by civic organizations of various cities and towns along the line to have the Georgia Railway & Power Company establish an interurban line between Athens, Ga., and Tallulah Falls, where the power company is preparing to carry out extensive water power development projects during the next few years. Purchase of the Tallulah Railway, owned by the Southern Railway, is advocated in order to complete the system. Committees representing the civic associations of the north Georgia cities and towns interested in the project will be appointed shortly to confer with officials of the power company in Atlanta.

Financial and Corporate

$1,079,726 Ordered Restored

Court Increases Judgment Allowed at Columbus Under Ruling of Special Master

A judgment of $1,079,726 in favor of the Columbus Railway, Power & Light Company, Columbus, Ohio, against E. W. Clark & Company, Philadelphia, former operating manager of the Columbus company, was rendered on Jan. 21 by Judge E. B. Kinkead of the Franklin County Common Pleas Court. The judgment far exceeds in scope the recommendations of Master Commissioner George B. Okey and goes almost the entire length of the complaint entered by the present home management of the company against the former managers, sustaining in all save one count the contentions of the complainants.

ITEMS INCLUDED IN JUDGMENT

A list of the items in the judgment against the Clarks showing amounts to be returned by the Clark Company is as follows:

1. Amount to be returned under management contracts........	$224,716
2. Amount to be returned under construction contracts and fees	49,828
3. Amount to be returned as profits on notes and bonds under McMeen contract	82,557
4. Amount to be returned as profits on $1,000,000 of bonds without knowledge of directors.	14,862
5. Amount to be returned as profits on notes without knowledge of directors	20,423

Amounts to be returned by the Clarks, expended by them:

6. By E. K. Stewart, general manager of the Columbus company, as its agent.......	386,202
7. By E. K. Stewart, general manager, from moneys known as the "John Scott Anderson" fund, as its agent	179,408
8. By E. K. Stewart, general manager, to C. C. Philbrick, ostensibly for advertising in the *Week*	54,995
9. In attempting to surrender the Columbus company's franchise, as directed by E. W. Clark & Company	66,734
Total	$1,079,726

The master commissioner's report embodied recommendation that judgment be made against the Clarks in the amount of $224,476, but the court saw fit to go further than was urged by the commissioner.

COLUMBUS UTILITY BADLY CRIPPLED

The judgment is entered on two outstanding propositions of law: First, that the directors of Ohio corporations are without authority to delegate their duties to others by means of "management contracts"; second, that directors occupy the position of trustees with relation to the stocholders, which position compels them to account minutely for their acts and administration of the company's affairs.

After reviewing the history of the Slaymaker case, in which the company appears as a cross-petitioner, the court first disposes of the objection raised by the Clark interests upon the ground that the case before the court was one concurrently of law and equity and hence the statutory limitation for such suits was four years, a point which, if sustained, would have left the Columbus utility badly crippled in its attempts to retrieve its losses, the court held that the case was one of equity, involving a ten-year statutory limitation.

In commenting on the management contracts phase of the company's affairs, Judge Kinkead says:

> It is the settled law of this State that directors of a corporation must themselves manage the corporate business of the corporate body with the view solely to the common interest of the stockholders and that they cannot directly or indirectly transfer such management and control to others.

The court then traces the history of the Clarks' connection with the company from 1892, when they began assisting in the formation of the company until the severance of connections in 1918. The Clarks began to take an interest in electric street railways in 1889. The first management contract was entered into with the utility in 1912, the Clarks to assume the management of the company and to receive 1½ per cent of the gross receipts in return. It was under this contract that Samuel G. McMeen was brought to Columbus by the Clarks, his salary being paid by them. Clarence M. Clark was named vice-president, E. K. Stewart being retained as vice-president, treasurer and general manager.

The court avers that the purpose of the Clark plan was to

> Control the action of the president and the board of directors, the paramount object being to secure all of the business of the railway within the scope of its business—the financial business, the engineering business and the auditing of the books; the latter, of course, is closely related to the financial business.

Later the court said:

> The final general results of the affairs of the company, after years of exploitation for personal gain by Clark & Company, furnishes the strongest evidence that could be secured. The company lost its financial standing, lost its good will, which meant everything; came nearly losing its franchise rights by attempted surrender, and came near the verge of general liquidation—all under the selfish management of persons whose sole desire was to invest the funds of the Clark banking house and to aid the bank to carry out its purposes and business.
>
> E. W. Clark & Company could have had no other purpose but to further the interests of the bank. Individual representation in the official positions obtained in the railway was for the sole purpose of personal gain for E. W. Clark & Company, so that its individual representatives could not fairly legally or equitably represent the stockholders of the railway in their dual capacity as trustees.

Counsel for the Clarks at Columbus said that the decision by Judge Kinkead would without a doubt be carried to the Court of Appeals.

Ohio Interurban Fails

Railway Operating 209 Miles of Line Passes Into Hands of President Wilson as Receiver

The Cleveland, Southwestern & Columbus Railway, operating 209 miles of track in Ohio, is now being operated under a receivership. Frank H. Wilson, who became president of the company last May, is acting as the receiver. The Cleveland, Southwestern & Columbus Railway is the second large Ohio interurban line to go into the hands of a receiver within the last twelve months. The Ohio Electric Railway is the other road so quoted. The receivership for the Cleveland, Southwestern & Columbus Railway became effective on Jan. 20, when the company admitted insolvency in the federal Court.

Mr. Wilson was named receiver by Federal Judge Westenhaver, after the filing by the General Electric Company of a petition alleging insolvency and requesting receivership. The General Electric Company alleged that the interurban company owed it $6,565 for equipment and also set forth that there are other creditors with claims totaling $200,000. The company has more than $7,000,000, par value, of bonds outstanding. Its authorized capitalization is $10,000,000, of which $6,648,000 is outstanding.

According to Attorney Frank H. Ginn of Tolles, Hogsett, Ginn & Morley, counsel for the company, the receivership was acceded to by the company to save the system from disintegration through individual creditor proceedings in lower courts. Mr. Ginn said that the receivership offers an opportunity to formulate and adopt some plan which will be fair to all interests, including the stockholders.

In addition to furnishing interurban service out of Cleveland to such cities and towns as Galion, Bucyrus, Ashland, Mansfield, Wooster, Elyria, Oberlin, Norwalk, Lorain, Berea, Medina, Amherst, Grafton, Wellington, West Salem, Lodi and Crestline, the company also sold large quantities of power in the territory tapped by its lines.

An official statement regarding the receivership made by counsel for the company follows:

> Mr. Wilson (the receiver) is an old steam railroad man. He became president of the Southwestern in May, 1921. Under his direction important economies and betterments were made but the extreme loss in gross operating revenues due to unfavorable economic and industrial conditions prior to his management so decreased the net revenues that the company has been unable to provide funds for the payment of bond interest.
>
> Many creditors have been persistent in forcing claims for payment and recently two banks of deposit, located outside Cleveland, applied the company's balance to obligations. Under these circumstances it was impossible for the company longer to operate under corporate management.
>
> The holders of some of the junior securities of the consolidated system have realized for some time that a reorganization would ultimately be required in view of the maturity in 1922 and 1923 of a number of underlying bond issues.
>
> A master will soon be appointed to pass on the outstanding accounts payable for supplies heretofore used in operation and it is hoped that the creditors holding such claims will not be inconvenienced for any great length of time.

$2,340,000 Saving Expected

Prospects Bright that Interborough Will Be Able to Cut Six Months' Costs This Sum—Brooklyn Receiver to Pay $4,000,000 of Certificates

Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., filed in the Federal court on Jan. 20 an answer to the suit of Clarence H. Venner for the appointment of a receiver because of failure to pay interest on a small amount of notes owned by Mr. Venner and the Continental Securities Company. Mr. Hedley said that he has opened negotiations with the Manhattan (Elevated) Railway looking to an immediate substantial reduction in the annual rental now required to be paid for the use of the elevated lines. This rental is 7 per cent on a valuation of $60,000,000, and the fact that the Interborough has spent about $50,000,000 in laying third tracks and extending the elevated lines, which lose money each year, has presented one of its difficult problems.

WHAT effect a separation of the subway and elevated system would have was described in the answer as follows:

> An abrogation of the Manhattan Railway lease, as urged by the plaintiff, would inflict untold hardship upon the general public (the discontinuance of transfers at 149th Street and Third Avenue would inconvenience about 80,000 passengers daily), and the inevitable litigation over claims and counter-claims between the companies would result in substantial loss to the security holders of the defendant.

It was said that even if there should be no reduction in the net Manhattan rent and that otherwise the situation remained unchanged, the Interborough's net corporate income would be sufficient to meet capital requirements for at least three years, providing the creditors continued their forebearance.

The expected decrease in operating expenses for the six months ending June 30, 1922, was given as follows:

Decrease in wages by reason of the multiple-door control as now installed	$550,000
Decrease in wages by reason of the installation of station turnstiles	125,000
Decrease in wages by reason of the 10 per cent reduction in wages, July, 1921	1,250,000
Decrease in cost of coal at approximately $1.25 per ton	415,000
Total decrease in operating expenses compared with said period previous year	$2 340,000

These figures were given to show the gradual decrease of deficit for the last six months to a surplus of more than $19,000 in December:

Month	Net Corporate Deficit.
July, 1921	$738,967
August	605,789
September	398,203
October	126,456
November	87,465
December	*19,317

*Surplus.

Mr. Hedley also said that the company expected adequate funds for the immediate future, although no plan of financing had been devised.

The answer stated that the semi-annual interest on the first and second mortgage bonds of the Manhattan Company have been paid, along with the quarterly instalment of the dividend rental due the stockholders on Oct. 1 last; that the floating debt of the Interborough now outstanding consisted wholly of bills for materials and supplies amounting to $1,650,000 on Jan. 1, and that its credit for similar material was not impaired. On Jan. 19 the defendant, it was stated, had $2,190,000 in its treasury for current needs, and in all probability this amount would be increased to $2,500,000 by Feb. 1.

Concerning the assertion in the complaint that a receiver should be appointed for the purpose of bringing actions against certain directors because of payments of dividends, the answer stated that from the commencement of the actual railroad operations of the company in 1903 to Dec. 31, 1918, "this defendant's net corporate income from all sources amounted in the aggregate to $80,215,181, while for the same period the dividends declared and paid upon its capital stock amounted in the aggregate to $65,625,000, showing a margin of income over dividends of more than $14,000,000," and that the plaintiff accepted his share of the dividend declared on Jan. 2, 1919.

It was said that "estimates for the five-year period ending June 30, 1926, indicate that the results from operation of the subway and elevated lines will be such that, even without any reductions in the existing rental paid to the Manhattan Railway, there will accrue to this defendant a net corporate income for the period over and above all charges of approximately $6,000,000."

After a discussion of the investments of the company in its trolley lines the answer referred to the proposed plan of the Transit Commission and said:

> The Transit Commission has publicly stated that it is about to issue its statutory plan for the readjustment of all New York City street railroads, including those operated by this defendant; that such plan when promulgated ought so to affect the status of this defendant as to make its position even better than as hereinbefore shown; that deponent believes that any action taken at this time looking to the appointment of such a receiver will be inimical to the public interest.
>
> Deponent further shows that if the plan of the Transit Commission shall not be ready and in effect by Sept. 1, 1922, when the extended three-year notes of defendant mature, it is to be assumed, in view of the action of the note-holders to date, that those three-year notes will again be extended for a reasonable period, provided that in the meantime they shall not have been funded; that negotiations are under way for a plan to fund the notes, in connection with the readjustment of the rental to be paid under the Manhattan lease, and that in deponent's opinion a denial of the motion for the appointment of a receiver herein will be of great benefit to the progress of those negotiations and will be in the interest of all concerned in the affairs of this defendant.

On the same day that the Interborough matter was before the court Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, presented his application to Judge Mayer for authority to pay off and purchase $4,000,000 of receiver's certificates out of a total of $18,000,000 now outstanding and for authority to extend the remaining $14,000,000 to Feb. 1, 1923. In presenting the matter to the court the receiver pointed out that the proceeds of the certificates had been used for capital purposes in the construction and equipment of the subways under Contract No. 4 with the city of New York.

The receiver stated that due to economies in operation, to the reduced cost of materials and supplies, to a reduction in wages and to improved efficiency, the net earnings of the rapid transit lines and of the Brooklyn Rapid Transit Company had shown material improvement as a result of which the receiver was in position by payment and purchase to retire $4,000,000 of the certificates now in the hands of the public.

Mr. Garrison indicated that if net earnings continue at the present rate he expected to be able to meet future requirements in connection with subway construction out of earnings and to retire during the next year a further substantial amount of receiver's certificates. The receiver also took occasion to comment upon the splendid co-operation which he was receiving from all of the employees and the earnest efforts being made by all of them to effect economies and to render good and effective service. The receiver also pointed out that the economies in operation had been brought out without in any way lessening the service rendered to the public.

Receiver and Counsel Awarded Allowance

J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, New Orleans, La., and Generes Dufour, general counsel, have been awarded $50,000 for their services rendered the insolvent during the three years of the receivership. This allowance is exclusive of $1,000 a month and $750 a month which are being paid to the receiver and general counsel since the property passed into receiver's hands.

Judge Rufus E. Foster, who made the award, explained further that the receivership of the New Orleans Railway & Light Company was a case in equity and not in bankruptcy and hence under the law governing such proceedings both the receiver and counsel are entitled to a commission as well as a salary. Compensation is a matter, Judge Foster said, entirely in the discretion of the court. The amount of further compensation is to be hereafter determined by the court and the allowance already prescribed is only a partial allowance of the court order.

The legal services performed in connection with the receivership do not include charges for the defense of damage suits, as these were handled by other law firms.

Stock Increase Approved

The plan calling for an increase in the capital stock of the Federal Light & Traction Company, New York, N. Y., from $11,000,000 to $21,000,000 has been ratified by stockholders at a special meeting called for that purpose. The additional stock is in the form of 8 per cent cumulative preferred. The issue of 55,000 shares of common stock of no par value was also authorized to be exchanged share for share for the present outstanding common.

Authority was also given to increase from 5 to not exceeding 7½ per cent per annum the interest paid on all or any part of bonds heretofore or hereafter to be issued under the terms of the thirty-year first lien 5 per cent sinking fund mortgage securing the issue. Subsidiary companies will be permitted to issue preferred stock without subjecting them to the lien of the mortgage.

When consummated the plan will provide a medium for the payment of accumulated dividends on preferred stocks. The last payment was made on Sept. 1, 1914. Several plans have been proposed for meeting the back dividends, but no decision has thus far been reached.

City Lines to Be Segregated

The Spokane (Wash.) City Railway has been organized to take over the city lines of the Spokane & Eastern Railway & Power Company. The new corporation has been formed with a view to enabling the company to segregate property which would be pooled with the Washington Water Power Company's railway lines, in the event of a consolidation.

F. E. Connors, vice-president and general manager of the Spokane & Eastern, has denied that the new corporation was organized to represent the two operating companies. He said:

> This is a move we have had in mind for some time. It permits us to divide our properties, and we know now just what we have to consolidate.

M. W. Birkett, acting general manager of the Washington Water Power Company, denied, too, that his company was interested in the new corporation.

The corporation is capitalized for $1,500,000. It was pointed out that the capital stock would have to be increased materially if the Washington Water Power Company's properties are pooled with the traction company's properties in the new corporation, since the valuation of the joint properties would total more than $5,000,000.

Incorporators of the Spokane City Railway are F. E. Connors, Waldo G. Paine, traffic manager of the Spokane & Eastern; Elmo Edwards, auditor; J. F. Gannaway, superintendent of the Inland interurban lines; J. W. Hone, claim agent; Louis C. Ream, an accountant for the company, and J. W. Hungate, superintendent of power.

Interurban Road Ordered to Be Sold

Supreme Court Justice Leonard C. Crouch has ordered a public auction of all assets of the Syracuse & Suburban Railroad, Syracuse, N. Y., to satisfy a judgment of foreclosure for $458,722 held by the Fidelity Trust Company, Philadelphia, Pa., trustee for the holders of $400,000 of bonds of the company.

The Syracuse & Suburban Railroad was one of the first interurban roads constructed in central New York. It was built in 1899. It operated successfully for a number of years serving Fayetteville, Manlius, Orville and Jamesville. State road and automobiles caused the downfall of the company, which was forced to curtail service several years ago to meet competition and advancing costs.

The Richey Conspectus of Indexes

With this issue the monthly publication is begun in this paper of the Conspectus of Indexes, prepared by Albert S. Richey, consulting engineer, Worcester, Mass. These figures have been arranged and mailed to a limited number of electric railway officials each month during the past year, and the limited service thus given has shown itself to be so valuable that arrangements have been made by the editors of this paper for its regular publication in the form shown on this page. The table will be brought up to date and published regularly in the fourth issue of the JOURNAL each month. From time to time these tables may be supplemented by charts showing the monthly variation in one or more of the twelve indexes shown.

The indexes showing the trend of street railway wages are computed by Mr. Richey.

The index of street railway fares is the average fare in all United States cities with a population greater than 50,000, exclusive of New York City, and weighted according to population.

The index of street railway materials is based on wholesale prices of the principal commodities which enter into street railway operation, including fuel, and weighted so as to represent as nearly as practicable the trend of costs of materials used in operation.

In computing the index of street railway wages, the maximum rates per hour for conductors and motormen in both city and interurban service for all roads in the country are combined in so far as Mr. Richey is able to secure information as to changes, and weighted according to number of cars operated.

The remaining nine indexes are reprints of figures furnished by the various authorities indicated.

Unfilled steel orders are as furnished by the United States Steel Corporation. Bank Clearings and Business Failures are as shown by Bradstreet.

The National Industrial Conference Board index of cost of living is obtained by weighting retail food prices as furnished by the United States Bureau of Labor Statistics with relative prices for clothing, shelter, fuel, light and sundries as determined by the independent investigations of the National Industrial Conference Board, in the following proportion:

Food	43.1
Shelter	17.7
Clothing	13.2
Fuel	3.7
Light	1.9
Sundries	20.4

This weighting has been determined by the National Industrial Conferences Board fairly to represent the distribution of expenditures in the average workman's family in the United States.

The indexes of the *Annalist*, Bradstreet's and Dun's are based on wholesales prices in the New York City market.

All of the other indexes shown include consideration of conditions in the United States as a whole.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Jan. 1922 **7 20**	Dec. 1921 **7 20**	Jan. 1921 **7 18**	May 1921 **7.24**	**4.84**
Street Railway Materials*	Dec. 1921 **159**	Nov. 1921 **158**	Dec. 1920 **213**	Sept. 1920 **247**	**100**
Street Railway Wages*	Jan. 1922 **215**	Dec. 1921 **216**	Jan. 1921 **232**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	Dec. 31 1921 **4.27**	Nov. 30 1921 **4 25**	Dec. 31 1920 **8 15**	Apr. 30 1917 **12 18**	**5 91**
U.S. Bank Clearings Outside N. Y. City (Billions)	Dec. 1921 **12.99**	Nov. 1921 **13 23**	Dec. 1920 **15 04**	March 1920 **18 54**	Av. Mo. 1913 **6.12**
Business Failures Number Liabilities (millions)	Dec. 1921 **2,380** **76 34**	Nov. 1921 **1,985** **72 30**	Dec. 1920 **1,736** **96 34**	Dec. 1920 **1,736** **96 34**	Av. Mo. 1913 **1,213** **24.64**

Conspectus of Indexes for January, 1922

Compiled for Publication in this Paper
by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
U.S. Bur. Lab. Stat. Wholesale Commodities	Dec. 1921 **149**	Nov. 1921 **149**	Dec. 1920 **189**	May 1920 **272**	**100**
Bradstreet's Wholesale Commodities	Jan. 1 1922 **11 37**	Dec. 1 1921 **11.31**	Jan. 1 1921 **12 66**	Feb. 1 1920 **20.87**	**9 21**
Dun's Wholesale Commodities	Jan. 1 1922 **164.4**	Dec. 1 1921 **164.5**	Jan. 1 1921 **198.6**	May 1 1920 **263.3**	**120.9**
Annalist Wholesale food	Jan. 14 1922 **159.9**	Dec. 17 1921 **164 2**	Jan. 15 1921 **199 9**	June 12 1920 **329 2**	**149**
U.S. Bur. Lab. Stat. Retail food	Dec. 1921 **150**	Nov. 1921 **152**	Dec. 1920 **178**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	Jan. 1 1922 **161 4**	Dec. 1 1921 **162 7**	Jan. 1 1921 **181 2**	July 1 1920 **204.5**	(1914) **100**

*Computed by Mr. Richey.

Net Income of P. R. T. for 1921 $1,400,000 More than 1920 Net

The income statement of the Philadelphia (Pa.) Rapid Transit Company for the twelve months ended Dec. 31, 1921, as shown in the accompanying table, shows a net income of $1,807,293, against $382,065 for the twelve months of 1920. In its report the company states that this figure of $1,807,293 has been expended for improvements in accordance with the published plan of the management. Increased appropriations from earnings for renewal account, required in order to make necessary improvement in the condition of the property, not only used up all the moneys saved through decreased wages but in addition increased the total cost of operation by upward of $2,000,000.

It is noted in connection with the traffic of the year just ended that although the total passenger revenue increased $3,525,207, the number of passengers carried decreased 71,934,784.

	1921	1920
Operating revenue ..	$42,420,605	$38,807,354
Operation & taxes...	31,233,589	29,195,166
Operating income ..	$11,187,016	$9,612,188
Non-oper. income....	490,435	592,987
Gross income	$11,677,451	$10,205,175
Fixed charges	9,870,158	9,823,110
Net income	$1,807,293	$382,065

PASSENGER REVENUE

	1921	1920
January	$3,552,152	$2,987,814
February	3,140,820	2,643,356
March	3,665,426	3,110,660
April	3,559,788	3,105,643
May	3,686,930	3,306,189
June	3 485,631	3,105,463
July	3,265,138	3,042,926
August	3,199,184	2,930,081
September	3,270,195	3,026,331
October	3,542,509	3,264,455
November	3,418,544	3,656,497
December	3,728 508	3,810,203
Total	$41,514,830	$37,989,623

TOTAL PASSENGERS

	1921	1920
January	71,205,982	74,552,909
February	63,033,838	65,615,757
March	73,721,200	77,592,919
April	71,797,138	77,836,256
May	74,455,275	82,908,613
June	70,507,266	77,707,233
July	66,123,403	75,979,563
August	64,929,724	73,387,880
September	66,390,051	75,598,837
October	71,861,509	79,535,980
November	69,190,828	72,359,721
December	73,331,137	75,406,467
Total	836,547,351	908,482,135

Dallas Railway Earns More than Seven per Cent

The total gross earnings from railway operation of the Dallas (Tex.) Railway for the year 1921 were $3,143,552. Of this amount $3,027,708 was derived from passenger revenue. The total expenses amounted to $1,803,649. The railway carried 60,935,075 passengers and operated 7,533,604 car miles.

Mr. Meriwether, vice-president and general manager of the property, in announcing the accomplishments of the year just ended said that the company earned a return of 7.63 per cent on the property value. Items amounting to $70,695 were removed during the year from the property value.

Financial News Notes

Reports Net of $762,386.—The Market Street Railway, San Francisco, Cal., has reported a net revenue from railway operations of $1,779,005 for the nine months period beginning April 1, 1921. The gross income amounted to $1,353,497 and the net income realized was $762,386.

Collateral Trust Shows Surplus.—The Chicago City & Connecting Railways, Chicago, Ill., shows a gross income for 1921 of $1,418,988 against $1,442,503 for 1920. After making deductions a surplus remains of $207,955 for 1921 against $194,633 for the previous year.

No Date Set for Payment on "L" Dividend. — The Interborough Rapid Transit Company, New York, N. Y., has announced that it is not known just when the dividend on the Manhattan Railway will be paid. This payment was due on Jan. 1. By the terms of the lease under which the Interborough operates the Manhattan Elevated the lessee is given ninety days of grace in which to meet the obligation.

Middle West Dividend Increased.—The Middle West Utilities Company, Chicago, Ill., has declared a quarterly dividend of 1 per cent on the preferred stock, payable on Feb. 15 to stock of record of Jan. 31. This places the stock on a 4 per cent basis for this year as against 3 per cent for last year and is in accordance with President Samuel Insull's promise whereby the rate will be increased 1 per cent each year up to 7 per cent.

Gold Bonds Offered.—White, Weld & Company and West & Company are offering $2,590,500 of thirty-year first lien gold bonds of the Federal Light & Traction Company, New York, N. Y. The price is 91¾ and interest yielding more than 6¾ per cent. The bonds are dated March 1, 1912, and are due March 1, 1942. The purpose of the issue is to retire $1,500,000 debentures due March 1, 1922, and to fund current indebtedness.

Question of Property Rights Before Court.—Judges Thomson and Orr of the United States District Court at Pittsburgh, Pa., now have before them for decision the question of determining what part of the equipment of the Pittsburgh Railways as now operated is properly the property of the Southern Traction Company. When that matter has been settled it is expected that the first step will be announced in connection with the actual sale of the property under foreclosure.

Railway Purchased. — The Walla Walla Valley Railway, which gives electric railway service to Walla Walla, and has an interurban line from Milton to Freewater, Ore. has been purchased by the Northwestern Improvement Company, a subsidiary of the Northern Pacific Railway. The Walla Walla Company is owned by the Pacific Power & Light Company. The deal does not involve the company's power and light holdings.

Successor Company Elects Officers.—The property of the Springfield (Vt.) Electric Railway, which has been in the hands of H. H. Blanchard as receiver, has passed to the ownership of the Springfield Terminal Railway Corporation as successor. At the meeting of the stockholders of the new company on Jan. 11 these directors were elected: Charles G. Staples, Edmund R. Pratt, E. A. Davis, E. S. French and John N. Harvey. The directors organized by electing E. S. French president, E. A. Davis vice-president, and Charles G. Staples treasurer. All the directors were present except Mr. Davis.

Venner Gets Judgment.—Supreme Court Justice Burr, who some time ago heard the application in three suits by Clarence H. Venner and corporations controlled by him for judgment against the Interborough Rapid Transit Company, New York, N. Y., on the ground that the answers of the Interborough to the actions on $50,000 in notes past due were of no legal effect, granted the applications on Dec. 9. Judgments against the Interborough will be entered in accordance with the decision, but no attempt will be made to collect on them pending an appeal from the decision. The main defenses were that Venner, who has specialized in the past in suits on various grounds against the Interborough, was the real claimant in each case and that the notes due in September were also the subject of litigation in the Federal Court. The answer of the company as made in the Federal Court is referred to on page 169 in this issue.

Denver Outlook Hopeful.—In commenting on the affairs of the Denver (Col.) Tramway in its issue of Jan. 8 the Denver *Post* said: "President Stenger, as receiver, has been directing his energies and the revenues of the company toward a rehabilitation of the company in all directions, replacing obsolete rolling stock with more modern equipment and restoring the tracks in all parts of the city, until today the tramway is in better physical condition than it has been in for twenty-five years. There has been an improvement in the personnel, which is apparent in many ways, and a consequent betterment in service, which, in spite of adverse general business conditions, is attracting a larger volume of travel and a natural increase in revenues. All these factors work to the advantage of the company's securities, and the mere fact that the latter are hard to procure in a rising market is a hopeful sign that the tramway will again come into its own as one of the more important elements in the city's activities."

Traffic and Transportation

Twelve Lines Rerouted

Chicago About to Carry Out Beeler Plan in Downtown District—Gains 11 per Cent Space

Cars in the downtown district of Chicago will be rerouted on Jan. 29 under a plan recommended by John A. Beeler, consulting engineer, some months ago. This plan was described in detail in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 26, page 938. It affects twelve of the main lines of the company and is designed to distribute traffic more equitably, allowing about 11 per cent more track capacity in that district.

To acquaint the public with the proposed changes the management will distribute several hundred thousand folders showing the changes on each of the lines. Besides a large force of uniformed supervisors will be distributed throughout the downtown territory to direct the people until they become used to the new order of things.

No action has been taken by the Illinois Commerce Commission since its order for a 5-cent fare on the Surface Lines was held up by a federal court injunction. It has been hinted that the commission will await the outcome of an appeal to the United States Supreme Court. Another suggestion is that the state body will limit the companies to a return of 6 per cent on the fixed valuation and require that the excess earnings be placed in a special fund to be used later on for reduction in the rate of fare.

The local transportation committee of the City Council is marking time on the various proposals which have been made for consolidation of the surface and elevated lines. The president of the board of local improvements recently offered to build a comprehensive system of subways by special assessment on property.

Duluth Rate Decision Delayed

Decision as to the proper permanent rate of fare for the Duluth (Minn.) Street Railway to charge will be delayed until after evidence as to the rate of return is taken in St. Paul by the State Railroad & Warehouse Commission.

In establishing a valuation, the company tried, at the hearing in Duluth, to include superseded property, such as horse cars and assets of the five companies existing before the present corporation, but was opposed. The company in its statement listed obsolete equipment and construction, including expenses of electric development and improvement, at $693,688. It also included $50,000 for uniting the system, interest cost up to $657,631, miscellaneous expenses at from $1,077,116 to $1,648,511 and a power contract, since abandoned, at $379,542.

The city is opposed to many of these figures. It will allow for all charges, exclusive of overhead expenses, a going value of $400,000. The total value placed by the company was approximately $1,509,477. Overhead expenses of the railway the city would list at about $310,709.

Must Add Cross-town Service

The Indianapolis (Ind.) Street Railway was recently ordered by the Board of Public Works to establish cross-town trolley service between Irvington and Mount Jackson, in Washington Street, operate some cross-town cars in Thirty-fourth Street, reroute College Avenue cars in the downtown district and reroute also cars on the Riverside line. Mayor Lew Shank had first sent a letter to the works board asking that the four changes be ordered.

The orders are to become effective not later than Feb. 1, the board instructed the railway company.

The Mayor suggested that at least one car each way every half hour be run through between Irvington and Mount Jackson in Washington Street. He said that eventually he wishes the railway to build a cross-town line in Twenty-ninth Street. There are no car tracks in that street now and it is not open in some blocks.

Change in Franchise Rate Sought

The South Carolina Light, Power & Railways Company, Spartanburg, S. C., is petitioning Council to order an election for a vote on the change of the franchise of the company, which is asking that the present fare of 7 cents, provided by the court under receivership, be made permanent. The company is also asking to be relieved of building the connection tracks, provided in the franchise, to Clifton No. 3 and Whitney.

There now exists a contract whereby the railway is obliged to repair those sections of the city streets between the company's tracks. This obligation is imposed upon the company in its franchise, and the South Carolina Light, Power & Railways Company sets forth in its petition that it wishes to have this franchise continued, but it asks that City Council be authorized to enter into such arrangements with the company in connection with this obligation as Council may deem most advantageous to the city's interests.

The petition asks that the maximum rate of $2 per 1,000 cu.ft. of gas now in vogue under the receivership be made permanent. George B. Tripp, receiver, refused to make any statement as to the petition.

Injunction Made Permanent

Attorney-General of Louisiana Prevented from Interfering with Collection of Eight-Cent Fare

The Federal District Court for the Eastern District of Louisiana, Judges Nathan P. Bryan of the Circuit Court, Rufus Foster of the District Court and H. D. Clayton of the District Court of Alabama, sitting en banc, on Jan. 21 made permanent the temporary restraining order issued by Judge Foster on May 20, 1920, at the request of J. D. O'Keefe, receiver of the New Orleans Railway & Light Company. This order enjoins the State's Attorney-General A. C. Coco from interfering with the company in the collection of an 8-cent fare or from bringing suit against the company in the exercise of that right.

It will be recalled that Attorney-General Coco, at the time the hearing on the petition for a permanent injunction was fixed, alleged that the matter to be solved involved a constitutional question, and at his request the temporary injunction named three federal judges to hear and determine the application for a permanent injunction.

The decision of the court was unanimous. It was announced orally by Judge P. Bryan and upheld the application for a permanent injunction, being accompanied by the declaration that the injunction restrains the Attorney-General and "not the State." The court said:

> If, by enjoining the Attorney-General, we are enjoining the State, it would be unconstitutional. We have decided we can enjoin the Attorney-General without enjoining the State. Therefore, the injunction shall be prayed for.

The decision of the district federal court as just rendered will have no special bearing on the moot question whether or not the Commission Council is a rate-making body and hence has or has not authority to enter into a conference with the railway fixing rates of fare and charging for gas and electric light and power.

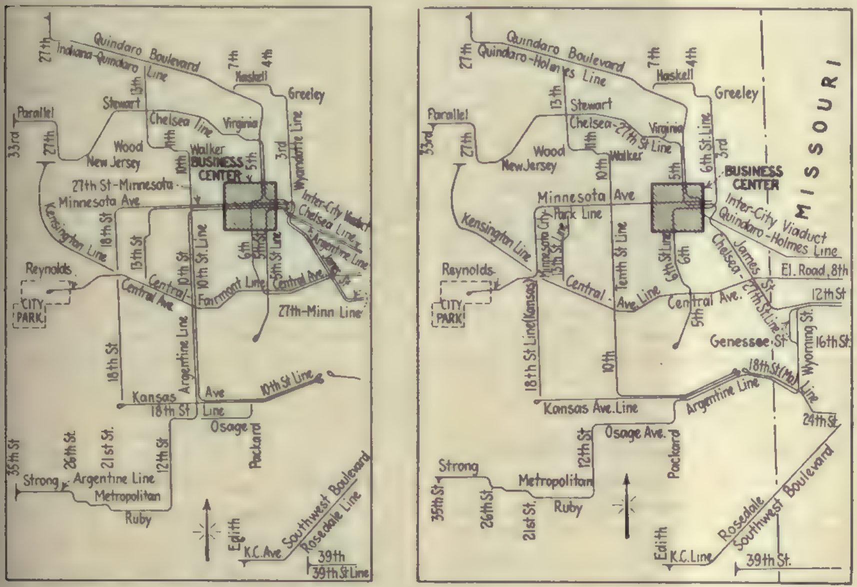
This is a matter yet to be determined by the United States Circuit Court of Appeals, before which tribunal it has already been argued and submitted and a decision in which case was expected to be handed down about Jan. 9. This suit and the suit in the State Supreme Court, on appeal from the district court, are the only matters of litigation now pending in the courts in the railway tangle at New Orleans unless Attorney-General Coco should decided to prosecute the case further by taking an appeal from the Federal District Court to the State Supreme Court.

It may be stated, advisedly, however, that no steps will be taken by the Commission Council or Commissioner Maloney of the Department of Public Utilities toward reopening negotiations with the security holders of the railway, which negotiations were abruptly terminated by the Supreme Court some time ago, until the field is clear of all legal entanglements and the city can see its way toward coming to some definite and amicable solution of the matter.

Rerouting Approved

Court Sanctions Modification of Beeler Plan for Use in Kansas City, Kan. —City Does Not Object

Judge Kimbrough Stone of the United States Circuit Court at Kansas City, Mo., responsive to an application by the receivers of the Kansas City Railways, recently issued an order establishing new routings for cars of the Kansas City Railways in Kansas City, Kan., and between the two Kansas Cities. The order came subsequent to a hearing in which representatives of the city of Kansas City, Kan., and all others interested were heard. The routings as now established are understood to be satisfactory. No objection was filed on the part of the city.



LEFT, TEMPORARY ROUTING IN EFFECT IN KANSAS CITY, KAN., IN SEPTEMBER, 1921; RIGHT, PLAN FOR PERMANENT ROUTING ADOPTED IN KANSAS CITY, KAN., IN JANUARY, 1922

The rerouting in Kansas City, Kan., has been delayed far beyond the period in which the Kansas City, Mo., reroutings were put into effect under the so-called Beeler plan. The chief obstacle to the Beeler program of rerouting in Kansas City, Kan., was the desire of every section of the city to have intercity service, complicated with the desire of the leading factors in the city to have numerous lines routed through the Kansas City, Kan., business center.

The situation of Kansas City, Kan., with reference to Kansas City, Mo., is such that about a third of the city's traffic passes Minnesota Avenue, the main business street, while bound for Kansas City, Mo. There were demands that additional lines be routed over Minnesota Avenue, which required long detours. Naturally the intercity traffic, too, was less than the local traffic, so that the demands for intercity service for all sections, could be met only with difficulty and at great expense.

Under temporary rerouting in September, 1921, six of the lines serving as many sections of Kansas City, Kan., were made intercity lines, either with terminals in the Kansas City, Mo., business district or made continuous lines serving sections of Kansas City, Mo. These six lines entered Kansas City, Mo., over three viaducts and passed through three downtown streets —two lines on each street. A seventh intercity line extended only a short distance into Kansas City, Kan., receiving passengers from Kansas lines bound for Kansas City, Mo. There was an eighth intercity line into Kansas, the Rosedale line, but this was not involved in the rerouting, as the Rosedale section is not closely connected with the other Kansas City, Kan., communities.

Operation under the temporary schedule enabled the receivers to test the expense of compliance with the the insistent demands for extensive intercity service. The receivers therefore went before the court with a showing as to the excess of expense in the elaborate service and declared that good service could be given with fewer intercity cars.

The new order eliminates two of the intercity routes and readjusts others for more direct operation, reducing the detouring. One line now passes the state line on the Intercity viaduct, entering at Sixth Street; another line uses the James Street viaduct and bridge and enters Twelfth Street; a third intercity line uses the Central Avenue viaduct, entering at Eighth Street. Only Twelfth Street has two intercity lines, its second being the Argentine, which comes now directly from the Argentine district, and no longer detours through the business section of Kansas City, Kan. The short line for transferring from Kansas lines continues to use Eighteenth Street.

The plan advanced by Mr. Beeler as in his opinion most advantageous for adoption called for concentrated service in Kansas City, Kan., with local lines radiating from the center of the business section of the city and heavy trunk line service from the center of Kansas City, Kan., to Kansas City, Mo. The idea behind this proposal was to build up Kansas City, Kan., and to give Kansas City, Kan., riders quicker and more direct service. Under the Beeler plan through riders between Kansas City, Kan., and Kansas City, Mo., would have had to transfer at the business center of Kansas City, Kan., to the trunk lines. The plan now put into effect is a compromise on this and secures about half the economies of the original proposal. The original plan would have saved about $300,000 a year, while the new plan will probably save not more than $150,000.

One-Man Cars Remain in Syracuse

On the eve of the hearing before the Public Service Commission of the demand of Syracuse, N. Y., for a reduction from the 8-cent fare and discontinuance of the use of one-man cars by the New York State Railways, Mayor Walrath reached an agreement with officials of the company for the continued use of one-man cars upon the installation of safety appliances.

Corporation Counsel Cregg, directing the fight before the commission against the fare and one-man cars, feels that this will be likely to prejudice the members of the commission against a reduction.

In a proposal submitted to the Mayor on Jan. 12, it is understood that the company definitely refused to give up the one-man cars. The terms of the proposal have not yet been made public. To provide for increased service the Mayor and officials of the company agreed that emergency control brakes and interlocking doors shall be installed.

Mayor Walrath stated shortly after the agreement had been reached that the action before the Public Service Commission for the abolition of one-man cars, might be dropped after these safety devices were installed. The proceedings were scheduled to begin on Jan. 30, but have been postponed because the railway would not have had time to demonstrate its improved service.

Both Mayor Walrath and his competitor during the campaign, came out positively against the continued use of one-man cars.

No Five-Cent Fare in Lynn

The Central Labor Union of Lynn, Mass., was recently notified by G. H. Gray, local manager of the Eastern Massachusetts Street Railway in Lynn, that it will be useless to look for a 5-cent fare until business conditions improve. He said that reductions had been made during the past year and will again be made when the company's finances permit.

To Ask 8-Cent Fare Continuation

The Washington Railway & Electric Company, Washington, D. C., expects to ask that the present fare of 8 cents cash and five tokens for 35 cents be continued when the Public Utilities Commission begins consideration of the railways cases on Feb. 1. With the continuation of the present fare, President Ham of the Washington Railway & Electric Company is confident that the company will be able to make the necessary track extensions. He regards work on the Eleventh Street line as most important, for it would relieve congestion on Ninth Street and Georgia Avenue. According to a recent statement, this extension would accomplish better results than the commission plan which provides for a new street between Seventh and Ninth Streets north of Florida Avenues.

Discussing the future rate of fare, Mr. Ham said that while the company had several bad years, last year was a reasonably good year. At the forthcoming hearing, he said, the question for the people to decide will be whether they want the rate of fare kept down to the minimum on which the company can exist or whether they want a rate of fare that will permit of extensions and improvements to service.

Wants Ten Cents in Boise

The Boise (Idaho) Street Car Company has applied for permission to put into effect a 10-cent rate of fare. In its financial statement supporting the application for increased rates the company states that from Jan. 1, 1921, to Dec. 31, 1921, the operating revenues amounted to $70,688 while operating expenses totaled $76,552. In this figure no allowance is made for depreciation.

The present rate is 5 cents cash with eleven-trip tickets for 50 cents. The company is now seeking a 10-cent cash fare with an eight-strip ticket for 50 cents.

Reasonable Rate of Fare Investigation Set

To determine if the rate of fare in the District of Columbia is reasonable, the Public Utilities Commission will hold public hearings beginning Feb. 1. The commission intends to investigate particularly the wages of trainmen and the necessity for track extensions.

The Capital Traction Company has a formal agreement with its men, nearly all of whom are unionized, which may be changed on March 31. Either the men or the company may open the wage agreement for revision by giving notice March 1.

The Washington Railway & Electric Company has no agreement with its trainmen, and may change the wage scale at any time. An official of the company said recently there are some union men on the W. R. & E. cars, but the company has no information as to their number.

For more than a year both street railway companies have paid their men 51, 54 and 56 cents an hour, according to length of service.

John H. Hanna, general manager and vice-president of the Capital Traction Company, said the company has not decided whether it will reopen the wage agreement in March.

Rejects Proposal to Petition for Lower Fares

The Board of Aldermen at Hartford, Conn., on Jan. 23, rejected a proposal to petition for a reduction in fare on the lines of the Connecticut Company. The vote was 13 against and 5 in favor. The report of a special committee appointed to look into the matter said in part:

> In view of the pending decision by Attorney General Daugherty as to the disposition of the lines of the Connecticut Company, it would seem that the time was not propitious to present such an appeal for the decision may change the entire aspect and promises of any appeal that might be made at this time.
>
> As the Connecticut Company has voluntarily issued new rates with a reduction of 16⅔ per cent on the present fares it would seem that any appeal made by the city might be further weakened, for the company will not have had opportunity to prove or disprove the value of the new rates.
>
> The Connecticut Company did not advance rates in proportion to the advance in the cost of running expenses, therefore, it would seem to require further time to make up the lost revenue.

This settles the question as to the matter of the city of Hartford in seeking further reductions in electric railway fares.

Service in Albany Will Be Investigated

The quantity and quality of service furnished in Albany, N. Y., by the United Traction Company is finally going to be probed by the Public Service Commission following the complaint of inadequate service and inability of one-man cars to meet traffic demands filed with the commission by Porter L. Merriman, Albany attorney. Chief Engineer Charles R. Vanneman of the commission has been ordered to investigate the complaint made by Mr. Merriman.

Similar complaints of service in Schenectady, where one-man cars have recently been installed, will soon be filed with the commission, it is understood. The United Traction Company claims that not only is the one-man car service more satisfactory to the people in general, but that the percentage of accidents is far less than it was for any given period under the two-man car system.

Wants Agreement Extended

General Manager Blinn of the Northern Ohio Traction & Light Company, Akron, Ohio, recently requested the public utilities committee of the new City Council to grant an extension of the 5-cent fare agreement. The temporary agreement between the old City Council and the traction company authorizing a 5-cent fare on the city lines expires on Feb. 1.

Prospects Not Bright in San Jose

Paul Shoup, president of the Peninsular Railway and vice-president of the San José (Cal.) Railroads, has issued a statement which explains fully the attitude of the management with respect to the applications for abandonment of service now pending before the State Railroad Commission. He said in part:

> The request for an increased rate of fare was denied and in good faith we have accepted the suggestions offered by the Railroad Commission as to ways and means of increasing the net revenue and are trying them out. The property has been and will continue to be economically managed, but in view of past experience and the fact that an adequate return has never been earned upon the investment, we have no alternative except to ask the patience of the people of San José while we try out the remedies suggested, for until the demonstration of increased earnings can be made, it is not proper to ask anybody to put more money into the property.
>
> A fair interest return is not being earned on the bonded debt nor even on the physical valuation given the property. We do not agree that this physical valuation is a true measure of the value of the property, but at this time that question is hardly before us since our earnings are so far short of a satisfactory return even upon the physical valuation given.
>
> We are now face to face with a situation where it would seem there is no hope of earning an interest return on our investments or even the interest on our bonded indebtedness. I am not at this time prepared to state what steps will be necessary, for first of all we want to follow up carefully the suggestions made in the State Railroad Commission's order.
>
> It may be that it will be necessary for the bondholders to get together in friendly conference to determine a course of action which, as has been suggested, might of course result in the properties again being separated. For the present the best thing to do is to follow the suggestions in the commission's order and measure the results when time has demonstrated them.

Omaha Case Still Before Commission

The Omaha & Council Bluffs Street Railway rate case is still before the Nebraska State Railway Commission. The railway commisioners were in Omaha during the week end Jan. 21 examining their own engineers on details of their independent original cost study. The railway continues to operate under a temporary passenger rate of 7 cents, with four tickets for 25 cents, this rate having been authorized on Aug. 10, 1920, and to continue until the commission shall have ordered a permanent rate. The commission is endeavoring to arrive at a fair valuation for rate making purposes.

New Britain Seeks Lower Fare

A petition for a 6-cent fare within the city limits of New Britain, Conn., without transfer privilege, will be made to the Public Utilities Commission at Hartford. In the petition the municipality points out that no trolley line from the city limits to the central transfer point is more than one-half mile long and that the charge made by the Connecticut Company of 10 cents for transportation from the city limits to the central transfer point is discriminatory and more than just, reasonable and adequate to provide properly for the public convenience, necessity and welfare.

Transportation News Notes

Refuses Review of Decision. — The Public Service Commission of New York has refused the application of the Schenectady Railway for review of the decision prohibiting it from continuing its two fare charges. These charges aggregated 13 cents within the Albany city lines. The decision confined it to a single local fare of 8 cents.

Six-Cent Fare Continues in Binghamton.—Continuation of the 6-cent fare until Jan. 15, 1923, was granted by the Public Service Commission to the Binghamton (N. Y.) Railway on Jan. 19. The Binghamton City Council had previously approved the petition. William G. Phelps, receiver for the company, has promised to install fifteen additional cars.

Fewer Transfers Issued. — Since transfers on the lines of the Birmingham Railway, Light & Power Company, Birmingham, Ala., cost 2 cents they are not so popular as when they were issued free. They were given out gratis a part of the month of November, 1921, but the rest of the month they were on sale for 2 cents. In November, 1920, the number of transfers amounted to 1,507,757, against 992,842 for November, 1921.

Improves Service. — The Pacific Northwest Traction Company announces a cut in running time from Seattle to Bellingham, of 25 minutes, according to John Hickock, superintendent. This has been made possible by gearing up the coaches to a maximum speed of 65 miles, an increase of 15 miles. The company operates its interurban to Everett, connecting there with motor buses to Mt. Vernon, and from there to Bellingham by interurban.

Will Consider Changes in Ordinance. —City officials at Sacramento, Cal., and officials of the Pacific Gas & Electric Company are considering modifications in the franchise which if adopted will result in a 5-cent fare. The railway has been authorized to charge 6 cents beginning Feb. 1. The State Railroad Commission has announced that if Sacramento would agree to certain changes in the franchise and a reduction of service in the city the fare would remain at 5 cents.

Non-Transfer Service on B. R. T.— Measures have been introduced in the New York State Legislature providing for the continuance of non-transfer service on the Church Avenue line in Brooklyn of the Brooklyn Rapid Transit Company and for re-establishment of such service on two abandoned lines in the city. The bill passed last year provided for waiver of the non-transfer service for a year only, and unless the new bill is passed the company will have to abandon all service on the line.

One Man Cars Will Be Used on Extension.—One man cars will be put in operation on the Norwood line of the Birmingham Railway, Light & Power Company, Birmingham, Ala., about Feb. 1, according to the announcement of J. S. Pevear, president and general manager under the receiver. The cars are rebuilt cars and will seat thirty-six passengers. The routing of the Norwood line through the business district will be changed and shortened so that approximately four to six minutes will be saved in getting in and out of the business district.

New Publications

Life of George Westinghouse

By Henry G. Prout, C.E., A.M., LL.D. Published by Charles Scribner's Sons, New York, 375 pages. Cloth. Price $2.50.

It was most appropriate that the initiative for the preparation of this biography should have come from the A.S.M.E., which represents so many interests with which Mr. Westinghouse was concerned, such as steam railroad, electrical, power, electric railway, and marine. This society appointed a committee of eminent members to supervise the work of publication, and its choice of an author was a happy one. Colonel Prout had long been a business associate as well as a personal friend of Mr. Westinghouse, and these facts with his engineering experience of many years and his literary ability peculiarly fitted him for the task. The completed volume will not only prove absorbing to those engaged in engineering pursuits to whom the details of the work of Mr. Westinghouse are more or less familiar, but should also appeal strongly to those who know of him only as a great inventor, organizer and manufacturer. Perhaps no book for a long time has been issued which is better adapted to inspire the younger engineers to emulate the activity, courage, persistence, resourcefulness and pleasure in undertaking and solving engineering problems characteristic of Mr. Westinghouse.

The first chapter is devoted to an account of the early life of Mr. Westinghouse. Briefly, he was born in Vermont in 1846, joined the northern forces in the Civil War at the age of sixteen and one-half years and at its close entered the works for the manufacture of agricultural machinery owned by his father at Schenectady. In 1865 when nineteen years old he took out his first patent, which was to be followed by nearly four hundred others.

His later activity was so great and in so many fields that it is wisely treated in the book under review by topics rather than chronologically. Chapter II is devoted to the air brake. This was his first great invention and perhaps the one with which his name is most closely associated in the popular mind. It is interesting to note that his idea to apply compressed air to the problem of braking came from a magazine article which he read on the use of compressed air in the drilling machinery used to pierce the St. Cenis tunnel in Europe.

The electrical work of Mr. Westinghouse began in 1883 with the Stanley incandescent lamp and a direct-current generator, but realizing the possibilities in transmission of alternating current he purchased the Gaulard & Gibbs patents in 1885. This system, improved and developed by Mr. Westinghouse and his engineers, was put out first with single-phase distribution at 133 cycles and was used, of course, only for lighting. The change to sixty cycles and polyphase distribution did not come until some years later when the induction motor was developed by another of Mr. Westinghouse's engineers, Nicola Tesla.

It will be impossible here to sketch any of the other portions of the book, which include chapters on the friction draft gear, the rotary converter, the Niagara Falls installation, electric traction, steam and gas engines, the turbo-generator, signalling and interlocking and natural gas, as well as two final chapters on the personality and meaning of George Westinghouse. Throughout the volume the reader is constantly impressed not only with the possession by Mr. Westinghouse of qualities which go to make up a great inventor and successful man of affairs, but with his attractive personal traits which won for him the wholehearted loyalty and affection of all who were fortunate to be associated with him in his many enterprises.

Of his influence in the electrical industry, the best summary is perhaps given in the words of Lord Kelvin quoted in the book, namely: "The electric development we know would long have been halted without his daring and resourcefulness."

McGraw Central Station Directory and Data Book

Published annually, 1921 - 1922 edition issued Jan. 1, 1922, 870 pages, bound in flexible covers.

This list has been published by the McGraw organization for more than twenty-five years. The general arrangement of the book and the data given are very similar to those in the Electric Railway List, the information including statistics of the power station and distribution system, details of the city contracts showing number, size and type of lamp used and rate received, number of meters, total connected power load, whether retailing electrical goods, etc. In the current issue more than 5,000 companies furnished new reports, and altogether more than 60,000 changes were made from the preceding edition. The book is published by the Directory Department of the McGraw-Hill Company.

Personal Mention

Mr. Feiker Continues with Department of Commerce

F. M. Feiker of the McGraw-Hill Company, publishers of the ELECTRIC RAILWAY JOURNAL, who for the past eight months has been assisting Secretary of Commerce Herbert Hoover in the reorganization of the department, has resigned. Mr. Feiker has not, however, completely severed his relations with the Secretary or the department. He has been appointed a special agent of the Bureau of Foreign and Domestic Commerce, to continue in a consulting capacity the work he has been rendering.

Last May Mr. Feiker was given leave of absence from the McGraw-Hill Company to join the Department of Commerce as a special administrative assistant of Secretary Hoover. He was selected because of his very wide knowledge of and experience and acquaintance in the American industrial field.

Under the direction of Mr. Feiker and Dr. Julius Klein, Director of the Bureau of Foreign and Domestic Commerce, the industrial and business contacts of that bureau have been enlarged, business relations with trade association committees have been established and the so-called Commodity Divisions of the bureau created. Mr. Feiker has drawn some fifty or sixty experts from the business world to the Department of Commerce to be of direct and specific service to American business. During Mr. Feiker's stay with the department "Commerce Reports," the Government's official foreign trade paper, has been changed from a daily to a weekly publication and its style and appearance completely altered more nearly to meet the needs of business. The "Survey of Current Business," a new publication destined to be of much assistance to American business men, was brought into existence. Mr. Feiker's services extended to the Bureau of Standards, the Bureau of the Census and other parts of the department. He served as editorial adviser on the department's board of editors.

C. Loomis Allen Withdraws from Railway Work

C. Loomis Allen, vice-president and general manager of the Syracuse & Suburban Railroad, Syracuse, N. Y., which is soon to be sold at auction, will enter the typewriter business, having with associates formed the E. R. Roberts Typewriter Company. He will remove from Syracuse to New York soon.

Mr. Allen organized the engineering firm of Mather & Allen in Syracuse in 1892 and was engineer for the Syracuse Rapid Transit Railway, and planned the consolidation and electrification of the present railway system in that city. He has been active at one time or another in the management of nearly every electric railway in Central New York. During the war he was for a time chairman of the American Electric Railway War Board with headquarters in Washington.

J. P. Barnes Made Bank Director

At the annual election of directors of the Citizens' Union National Bank, Louisville, Ky., probably the largest bank south of the Mason & Dixon line, James P. Barnes, president of the Louisville Railway, was elected a member of the board. This is an honor, especially in view of the fact that Mr. Barnes has been in Louisville not quite two years. Mr. Barnes was also elected a director of the Louisville Industrial Foundation recently, and is also a member of the Mayor's advisory committee, composed of leading business men and members of the business organizations of the city.

Mr. Stratton to Superintend Eastern Pennsylvania Railways

On Jan. 1 A. J. Stratton was made assistant superintendent of the Eastern Pennsylvania Railways, Pottsville, Pa., an appointment which follows his excellent work for that company since December, 1920.

Mr. Stratton's first appearance in the electric traction field was in 1912, when he became engineer of maintenance of way of the New York & Queens County Railway, New York, N. Y. His work up to that period had consisted, he says, of "buffeting around" New York. In 1915 Mr. Stratton went to the Mobile Light & Railroad Company, Mobile, Ala., as engineer, but the next year he accepted a similar position with the Binghamton (N. Y.) Railway during the reconstruction of that property.

In 1916 he transferred his activities to the northern part of the country and for two years was assistant engineer of way and structures of the Brooklyn Rapid Transit Company. In 1918 he advanced still further in his work when he became assistant engineer of the valuation department of the Metropolitan Edison Company, Reading, Pa. Since 1920 Mr. Stratton, besides his engineering work as superintendent of maintenance of way of the Eastern Pennsylvania Railways and associated lines, has acted in various engineering capacities for the J. G. White Management Corporation properties. His latest appointment is a recognition of Mr. Stratton's special merit and his grasp of details in relation to track construction problems.

E. F. Greenleaf Busy with Two Offices

Emile F. Greenleaf has been advanced recently from superintendent to general superintendent of the Orleans-Kenner Traction Company, New Orleans, La. He is carrying on the work as well of the office of president. Some time ago T. G. Bush gave up his duties as president of the company, and since then Mr. Greenleaf has been in executive charge.

Mr. Greenleaf is an experienced electric railway man. He started with the Orleans-Kenner Traction Company as right-of-way solicitor in the years before construction on the lines had been started. With the building of the railway he was given a minor position, from which he has been advanced by successive steps to his present position of general superintendent.

The office of president of the company will be filled at the meeting of the board of directors which will be held in April.

Obituary

William J. Hart died at Syracuse, N. Y., Jan. 12, after an illness of one year. Throughout his life Mr. Hart was associated with electric railways. He built the Geddes line, the first in Syracuse, which ultimately became part of the New York State Railways, and later became superintendent of the line. Other construction in which he was engaged include the electric railway lines at Saginaw, Mich., and the line connecting Detroit and Mount Clemens, Mich.

Griffen S. Ackley, well known as an inventor of brakes and brake appliances, died in Brooklyn, N. Y., Jan. 23. He had been ill since October. Mr. Ackley was famous in the history of the electric railway industry as the inventor of the Ackley No Staff Brake and the Ackley Adjustable Brake. He established the National Brake Company in Buffalo (N. Y.) in 1903. Of this company he was president until 1909, when he sold his interests and formed the Ackley Brake & Supply Corporation, with headquarters in New York City. This company handles Mr. Ackley's inventions and has branches in Germany, France and England to promote and sell his brakes. He was president of the company until his death. Mr. Ackley spent much of his time in recent years in travel, particularly in Europe, where his brakes were extensively used. He was born in Springhill, Pa., in 1851. To reach the important position which he commanded he overcame innumerable difficulties in connection with his work. His courage was limitless and carried him persistently ahead in the face of any disappointment. To his friends this tenacity of purpose was his outstanding characteristic.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

E. H. Dewson Succeeded by J. C. McCune

Of interest in electric railway circles is the recent announcement that E. H. Dewson, widely known as an authority on rapid transit problems, has retired as district engineer of the Westinghouse Traction Brake Company, in the Eastern territory, and will henceforth serve his company entirely in a consulting or advisory capacity.

Mr. Dewson has been with the Westinghouse interests since 1901, when the old Standard Brake Company was acquired by Mr. Westinghouse and moved to Wilmerding, Pa., to be known as the Standard Traction Brake Company. Mr. Dewson had been chief engineer of the Standard Brake Company, a position which he retained under the new management. Several years later the engineering departments of the several Westinghouse companies at Wilmerding were consolidated, the Standard Traction Brake Company changing to the Westinghouse Traction Brake Company and Mr. Dewson becoming assistant chief engineer of the united organization. When the district organizations of the Westinghouse Traction Brake Company were created, Mr. Dewson was named resident engineer for the Eastern district, and has since remained in this post, maintaining headquarters in New York City.

E. H. Dewson's successor as district engineer of the Westinghouse Traction Brake Company in the Eastern territory is his former assistant, Joseph C. McCune. Mr. McCune is well known as a frequent contributor of articles on air brakes in the technical press.

He joined the Westinghouse Traction Brake Company after he was graduated from Cornell University. He served through the war as an officer of engineers, acting as an instructor in the Third Officers' Training Camp at Camp Lee, Va., and later saw service in France as a member of the Expeditionary Forces. He will maintain his present headquarters in New York.

Trade Abroad During 1921

Europe is still our greatest customer and our overseas transactions with the countries of that region during 1921 considerably surpassed 1913 figures, says the Department of Commerce in a brief estimate for the year. American trade with European countries was greater by $775,000,000 in 1921 than during the pre-war year 1913. Even with the higher value of the dollar, the department declares that trade with Europe was larger than in 1913.

Of the various European countries, the United Kingdom is our best customer, while Germany has now risen to second place as a consumer of American goods. Our exports to Germany during 1921 exceeded by about $25,000,000 our exports to that country in 1913, and final 1921 figures for Germany will show an increase over 1920.

Trade between the United States and Latin America increased by 100 per cent in value during 1921 as compared with 1913. The Commerce Department estimated that trade between all the countries of Latin America and the United States amounted to $1,404,000,000 as against the total of $730,000,000 in 1913. If the trade for 1922 and succeeding years shows no decrease over 1921, it may fairly be said that on the whole we have emerged from these years of economic prices and depressions with a substantial net gain of our business with Latin America.

Bids for Electrification of Brazilian Railway

The notice for sealed bids for the electrification of the Central of Brazil Railway was published in the *Diario Official* for Nov. 27, 1921. The notice according to *Commerce Reports* for Jan. 9, calls for proposals on the electrification of stretches of the line, the operation of traction and transport material, the construction of substations, and various other improvements on this important Brazilian railway. It is quite probable, however, that a new proposal will be issued, as strong objections have been made to some of the terms of the present one.

The proposals will be received on March 30, 1922, at 1 p. m. A bond of 200 contos is exacted to guarantee the signature of the contract. Only those competitors will be considered as fit who can prove, in addition to sufficient financial capacity, that they have furnished and mounted large installations of electric traction, including installations for operation in large railway yards. In order to guarantee the execution of the contract, the bond will be raised to 500 contos of reis.

The works relating to the suburbs of Rio de Janeiro are to be concluded within a period of two years and the other works within a period of three years, both counting from the date of registry and approval by the Tribunal de Contas.

There will be three or four substations, the first being between Mangueira and S. Francisco, the second close to Deodoro, and the third or fourth between Deodoro and Belem. Thirty locomotives will be required, ten for freight and twenty for passenger trains. For the suburbs, sixty-six motor cars will be necessary, composed of sixty first-class cars and six second class; 100 second-class box cars will also be purchased. For the SS and SD trains there will be thirty-two motor cars and forty-eight box cars.

The lines to be electrified are the following: (a) The lines of the Central Station yard; (b) Eight freight lines between Central Station and the entrance of the elevated line next to the deposit of S. Diogo (1,000 meters); (c) The yard lines of the deposit of S. Diogo; (d) The lines to the Maritima Station and those of the respective yard; (e) The lines of the Central Station to the respective carhouses as well as all of the lines of this carhouse; (f) The lines to the projected station freight yard next to the Mangue Canal, as well as those of the respective yard; (g) Four main lines from the beginning of the elevated line next to the deposit of S. Diogo up to the Engenho de Dentro Station (10,070 meters); (i) Two main lines from the Deodoro Station to Belem, on the line from Centro, and that of Santa Cruz on the Santa Cruz branch (39,468 meters and 32,544 meters); (j) A line between Belem Station and the Paracamby Station (8,306 meters); (k) The circular lines from D. Clara Bangu and Matadouro; (l) The line from the Deodoro Station to the carhouse, cleaning and repair of rolling stock, as well as all the lines belonging to this installation.

Automatic Substation Equipment for Portland, Ore.

One of the largest single orders for automatic railway substation equipment placed in this country is announced by the General Electric Company for the Oregon Electric Railway, Portland, Ore., which will result in making entirely automatic (with the exception of one station in the city of Portland) the operation of the 180 miles of track on this road.

The order comprises automatic control for seven synchronous converter substations, replacing the present manual control which has been in operation since 1912. The stations to be changed over are at Moffett, Tonquin, Pirtle, Lassen, Waconda, Cartmey and Orville. At Moffett and Tonquin there are two 500-kw., 600-volt converters connected in series giving 1,000 kw. at 1,200 volts for each. The remaining five stations have single-unit, 500-kw., 1,200-volt converters installed.

The automatic control will include the General Electric Company's standard practice of separate excitation of the converters to insure correct polarity at starting. Designed along standard lines for present railway practice, the equipment at each station will consist essentially of a motor-driven drum controller, exciter, contactors, switches and relays with protective devices and load limiting resistors. The exciter, which is operated by the same motor as the controller, will provide the separate excitation. The stations will be connected to the line or shut down in accordance with the power demands from cars on the lines.

The Oregon Electric Railway, an interurban line owned by the Spokane, Seattle & Portland Railway, is operated at 1,200 volts direct current stepped down from a transmission line voltage of 60,000 at 33 cycles. The present rolling stock consists of sixty-two motor cars, twenty-eight trailers and ten 50 to 60 ton freight locomotives. There are 154 miles of route on the system.

Window Glass Prices Reduced

Electric railways will be able to buy window glass cheaper as a result of a price war between importers and American glass manufacturers. General price cuts were announced during the week closing Jan. 21 by the American Window Glass Company, manufacturing probably one-third of the country's output of window glass. The reduction aggregated 22 per cent, and doubtless will remain operative until a protective tariff schedule can be worked out to give adequate protection to American glass industries.

The price reduction on very small sizes of single strength window glass, averaging twenty-five united inches, upon which competition was keenest, was approximately 31 per cent. On sizes a little larger, on which competition was not so keen, the reduction worked out to about 23½ per cent, and on the larger sizes, where competition up to the present time has not been so great a factor, the cut was made at 20 per cent. The average reduction was about 22 per cent.

These price reductions resulted in an immediate change in discounts on jobbers' lists here, when the new discounts on single strength A quality window glass became 84 per cent to 87 per cent, depending upon sizes, and on single strength B quality, 85 per cent to 88 per cent. The new discount off jobbers' lists on double strength A quality window glass is 85 per cent, and on B quality 87 per cent.

Manufacturers having taken this step are not thought likely to return to the former price level so that consumers of window glass may consider the cut permanent, at least as far as the first half of the current year is concerned.

Metal, Coal and Material Prices

Metals—New York	Jan. 24, 1922
Copper, electrolytic, cents per lb.	13.50
Copper wire base, cents per lb.	15.12½
Lead, cents per lb.	4.70
Zinc, cents per lb.	4.61
Tin Straits, cents per lb.	31.37½
Bituminous Coal, f.o.b. Miners	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.70
Somerest mine run, Boston, net tons	1.80
Pittsburgh, mine run, Pittsburgh, net tons	2.15
Franklin, Ill., screenings, Chicago, net tons	2.05
Central, Ill., screenings, Chicago, net tons	1.72
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, New York, cents per lb.	6.50
Weatherproof wire base, N. Y., cents per lb.	16.25
Cement, Chicago consumers net prices, without bags	1.97
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	76.00
White lead, (100-lb. keg), N. Y., cents per lb.	12.25
Turpentine (bbl. lots), N.Y., cents per gal.	92.00

Rolling Stock

The Glendale & Montrose Railway, Glendale, Cal., has placed in service one standard safety car, manufactured by the American Car Company.

The Southwestern Gas & Electric Company, Texarkana, Ark., reports the purchase of two standard safety cars from the National Safety Car & Equipment Company.

Chicago (Ill.) Surface Lines was reported in an unconfirmed daily press dispatch late on Jan. 26 as having suffered a loss of $2,000,000 in the destruction by fire that day of a North side carhouse and part of its rolling stock equipment.

The San Francisco-Oakland Terminal Railways, Oakland, Cal., has constructed one closed steel motor car for city service, in its own shop. This car is 48 ft. 6 in. long and has a seating capacity of fifty-two.

Toledo & Western Railroad, Toledo, Ohio, has ordered through its receivers three new light cars for suburban traffic. The new cars are to weigh twelve tons instead of thirty tons as the old equipment did.

United Electric Railways, Providence, R. I., has ordered a sufficient number of one-man cars to begin running an eight-trip-an-hour schedule instead of the present six-trip schedule on the Elmwood-Chalkstone Avenue line.

Track and Roadway

Fresno (Cal.) Traction Company has started on the work of lowering its tracks to the street grade on Olive Avenue. These tracks are to be lowered approximately eighteen inches.

Cultus Lake, B. C.—The development of extensive timber limits in this vicinity will necessitate the building of 5 miles of electric railway connecting with the British Columbia Electric Railway's Fraser Valley line near Sardis.

Murphysboro & Southern Illinois Railway, Murphysboro, Ill., will be extended from Carbondale to Herrin. Five hundred citizens of Herrin have subscribed $100,000 for this extension. Work will be begun next spring and service started in the fall of 1922.

Los Angeles (Cal.) Railway is rebuilding Third Street between Gramecy Place and Norton on the West Sixth Street line. Work is also under way at Vermont and West Sixteenth where on account of the opening of West Sixteenth Street it is necessary to lower the tracks.

Power Houses, Shops and Buildings

New Orleans Railway & Light Company, New Orleans, La., through D. P. O'Keefe, receiver, and A. L. Kempster, general manager, is proceeding with extensive additions to its power plant and distributing systems, including the installation of a 20,000-kw. turbine and auxiliaries.

Los Angeles (Cal.) Railway put its automatic substation at Garvanza Avenue near York Boulevard into service on Jan. 1.

Portland Railway, Light & Power Company, Portland, Ore., has completed work of laying foundations at the Sellwood carhouse for the erection of two steel towers for sprinkler tanks, to replace the wooden tanks now in use. The towers will be 75 ft. high and the tanks will have 50,000 gal. capacity. Between 36 and 40 tons of steel will be required, which is being fabricated in Portland.

Trade Notes

J. T. R. Bell, who for the past five years has been general sales manager of the Gurney Ball Bearing Company, Jamestown, N. Y., has resigned from that company and will take up the manufacture of a new type of anti-friction bearing.

Rome Wire Company, Rome, N. Y., has opened district sales offices in New York City at 50 Church Street. H. S. Hammond, who has represented the company in the Eastern territory for the past twenty years, has been placed in charge of this new office.

The C. H. Wheeler Manufacturing Company, Philadelphia, Pa., announces that H. W. Cross, formerly with the General Electric Company, has now assumed the management of its New England office, with headquarters at 53 State Street, Boston, Mass.

Combustion Engineering Corporation-George J. Hagan Company, Pittsburgh, Pa., announces that the Hagan Company has discontinued representation of the Combustion Engineering Corporation. The Combustion Engineering Corporation has opened its own office in the First National Bank Building, Pittsburgh, Pa., and will soon open an office in Cleveland, both of which will be in charge of W. C. Stripe, former manager of the Philadelphia office. The George J. Hagan Company will retain the exclusive agency for the type "H" stoker, formerly known as the American stoker, for use in Hagan Industrial Furnaces.

New Advertising Literature

The Elliott Address-Press, New York, N. Y., has issued a folder describing the advantages of using its Address Cards and Address-Press for mailing information which will go to the same person at successive intervals.

The Cutter Company, Philadelphia, Pa., has issued a thirty-six-page booklet describing in considerable detail various types of steel box mountings for its I-T-E circuit breakers. Various other details in regard to satisfactory mounting and use of these circuit breakers are also given.

PEACOCK IMPROVED BRAKES

Have the Automatic Stop

A device which is one of the chief contributing reasons for the successful and satisfactory operation, the reliability and safety of Peacock Improved Brakes. This Automatic Stop positively prevents the unwinding of drum and brake chain beyond the point of full release. It saves unnecessary time-wasting winding of useless slack on the next application of the brakes. Whether your hand-brakes are simply emergency accessories to the air brakes, or used in regular service, it pays to have the safer kind.

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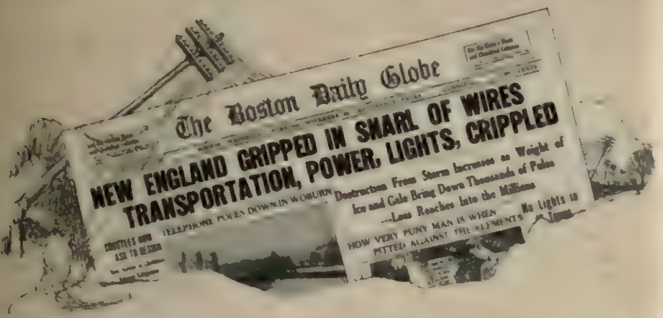

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Jawari

According to the Persian legend it was not apples but wheat (jawari) which caused all the trouble for Adam and Eve. The exact translation says. "When our parents forfeited heaven by eating wheat, which deprived them of their primeval purity, they were cast down upon the earth, Adam at Ceylon and Eve upon Arafat."

Our artist seems to have gotten the wrong impression however. To him it was Adam at Ceylon and Eve upon Adam. Although not at all henpecked he confided to us later that he was sure Eve established the precedent for wives jumping on their husbands *immediately upon her arrival.*

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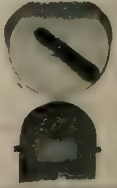

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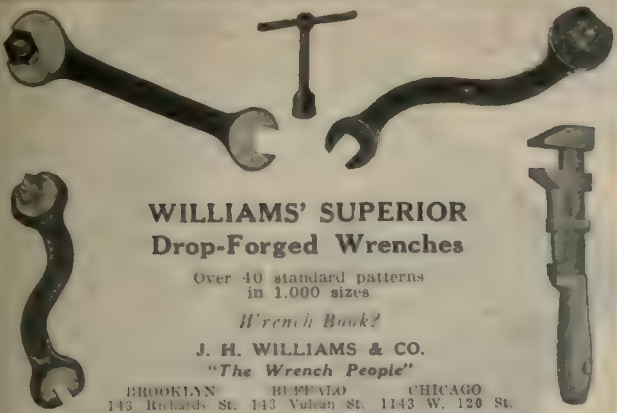

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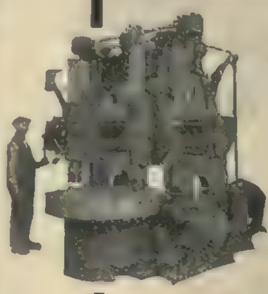

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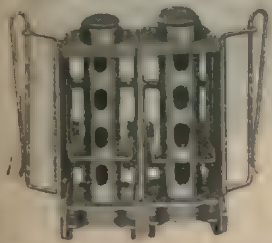

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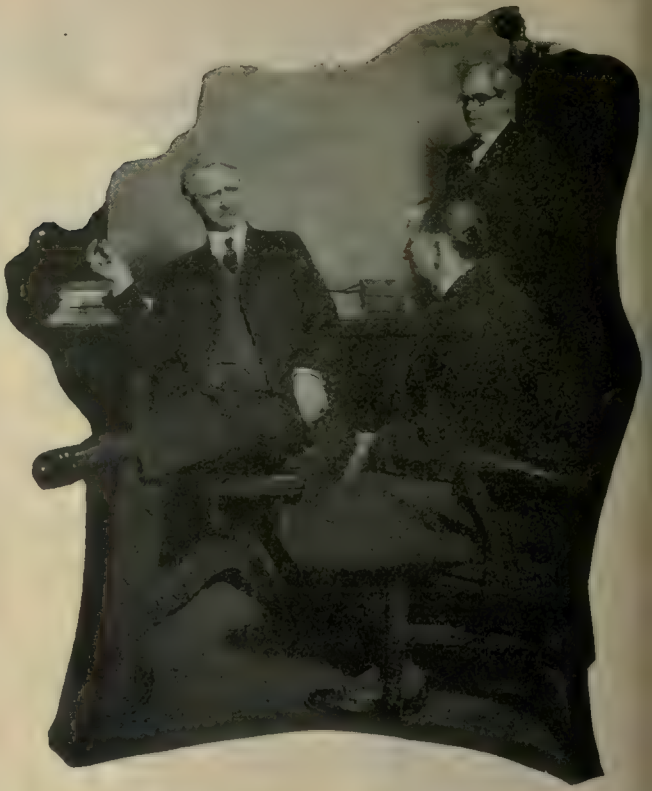

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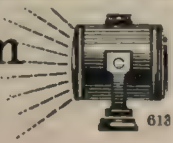

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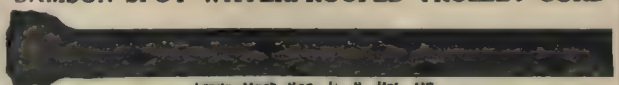

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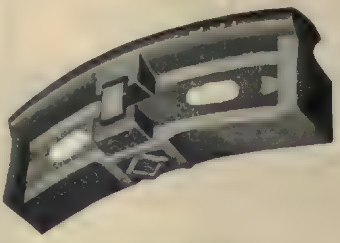

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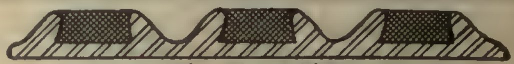

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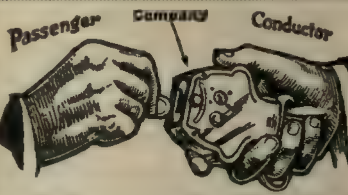

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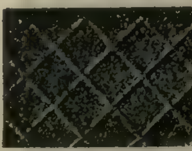

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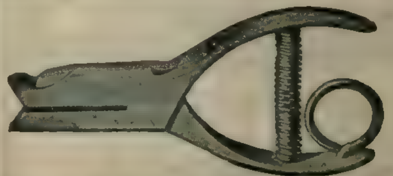

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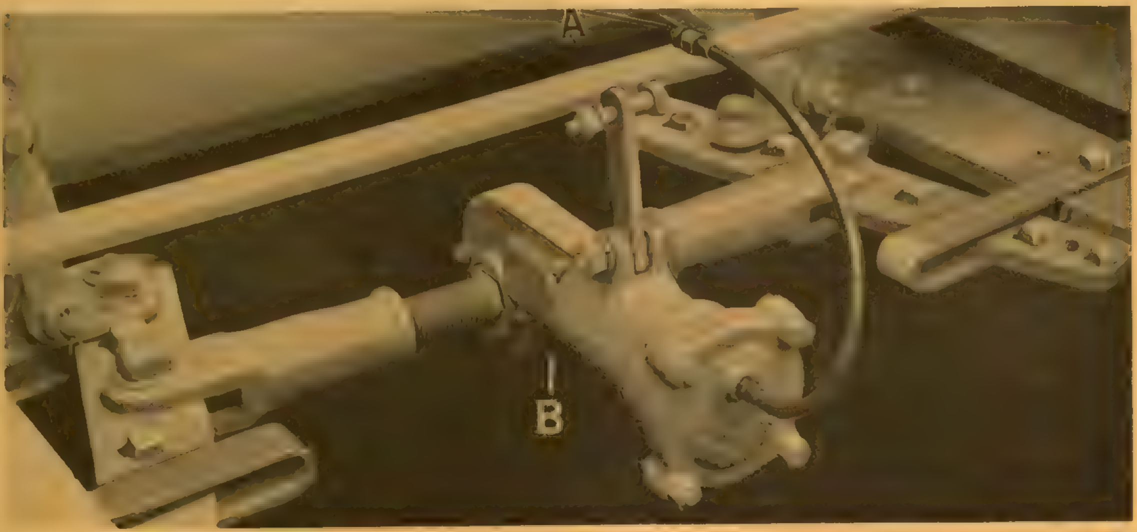

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Vol. 59, No. 5 New York, February 4, 1922 ***Pages*** **179-222**

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors **Henry H. Norris, Managing Editor**

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A Publication's Character

LAST WEEK mention was made of the interest in the McGraw-Hill publishing plant by the six hundred civil engineers who visited the building as the guests of *Engineering News-Record.*

The thing which makes it possible for a business and technical paper to grow from a corner room in a side street to an organization housed in a thirteen-story building is the paper's character.

The ELECTRIC RAILWAY JOURNAL and its associated McGraw-Hill publications are based on Standards of Practice, now the common platform of the 125 members of the Associated Business Papers, Inc.

From time to time we shall comment on and interpret these standards one by one.

"The publisher of a business paper should dedicate his best efforts to the cause of business and social service, and to this end should pledge himself:

First: To consider first the interests of the subscriber.

Second: To subscribe to and work for truth and honesty in all departments.

Third: To eliminate, so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns and to make his criticisms constructive.

Fourth: To refuse to publish puffs, free reading notices, or paid write-ups; to keep his reading columns independent of advertising considerations, and to measure all news by this standard: 'Is it real news?'

Fifth: To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.

Sixth: To solicit subscriptions and advertising solely on the merits of the publication.

Seventh: To supply advertisers with full information regarding character and extent of circulation, including detailed circulation statements, subject to proper and authentic verification.

Eighth: To co-operate with all organizations and individuals engaged in creative advertising work.

Ninth: To avoid unfair competition.

Tenth: To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function."

Circulation of this Issue, 6,000. **Advertising Index—Alphabetical, 52; Classified, 48, 50; Searchlight Section, 47**

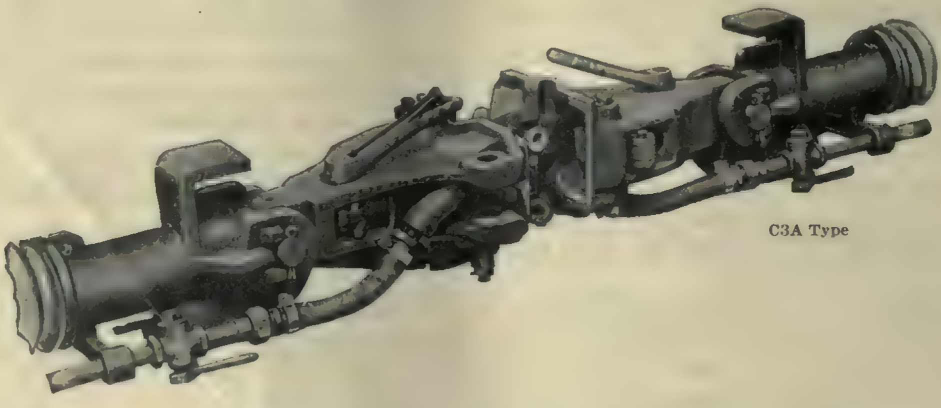
WESTINGHOUSE

"Tight-Lock"
(AUTOMATIC)
CAR AND AIR COUPLERS
FOR TRACTION SERVICE

SAFETY. Eliminate personal danger in coupling cars; cannot separate by accident, while in operation, due to unevenness of track or other cause; coupling remains tight and safe even if lock on one coupler becomes deranged, locks being so designed that one alone is required to prevent uncoupling except in usual manner.

TIME ECONOMY. Couple and uncouple both car and air connections simultaneously; reduce time required to make up trains at terminals or to cut cars in and out en route; will couple and uncouple cars of varying height, on straight or curved track, without delay.

LOWER MAINTENANCE. All slack eliminated, preventing severe shocks and damage to apparatus between cars; flexible hose couplings rendered unnecessary; gasket wear reduced; air connections accessible; strong and durable in design.



C3A Type

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

OFFICES:

Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Colo.
Houston, Tex.
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San Francisco

TRADE MARK

WESTINGHOUSE TRACTION BRAKES

Denver, Colo.

Don't let the old cars drain the profits—

Convert Them the SAFETY CAR Way

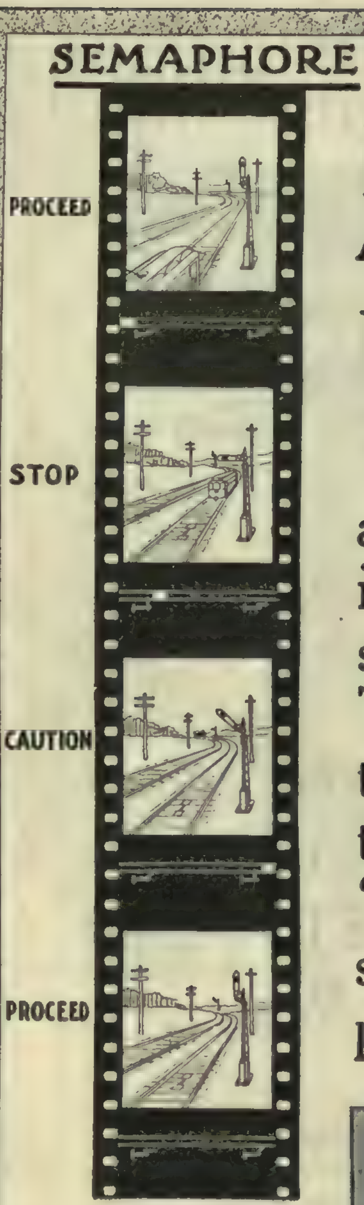
THERE is no longer any question as to the greater usefulness and earning power of the old-type, medium weight, double truck car when converted for one-man, two-man operation.

At comparatively small expense these old units can be endowed with "new life", by slightly altering the design and installing *standard Air Brake and Safety Car control equipment.*

Cars converted in this manner possess a degree of flexibility which makes them equally adaptable for slack or rush-hour service -- and operating expenses can be regulated to correspond with traffic density!

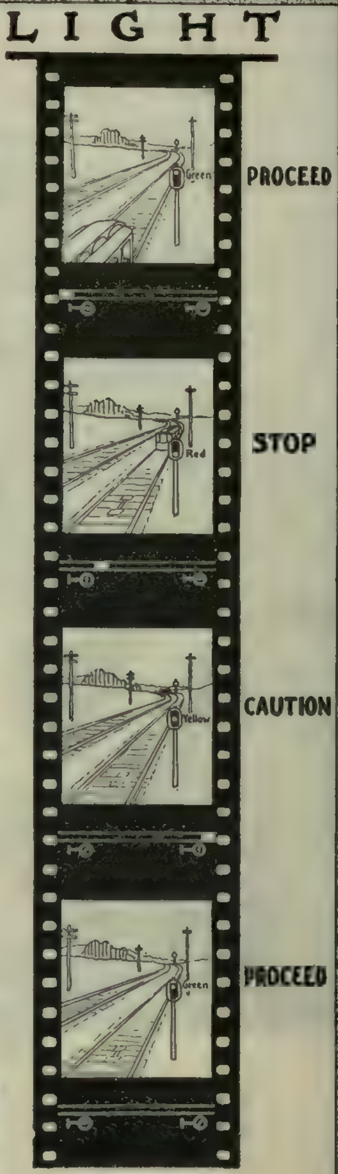
That Is the SAFETY CAR Way

SAFETY CAR DEVICES Co.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



FOR DOUBLE TRACK
Interurban Railways

Union automatic
▪ block signals ▪
afford a simple system of indications easily understood by trainmen.
The continuous A. C. track circuit makes possible the use of "polarized" or "wireless" control and insures the display of the proper indication at all times.



On the New York State Railways

On the Oakland, Antioch and Eastern

UNION EQUIPMENT WILL SOLVE YOUR INTERURBAN TRAFFIC PROBLEMS

Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your line*.

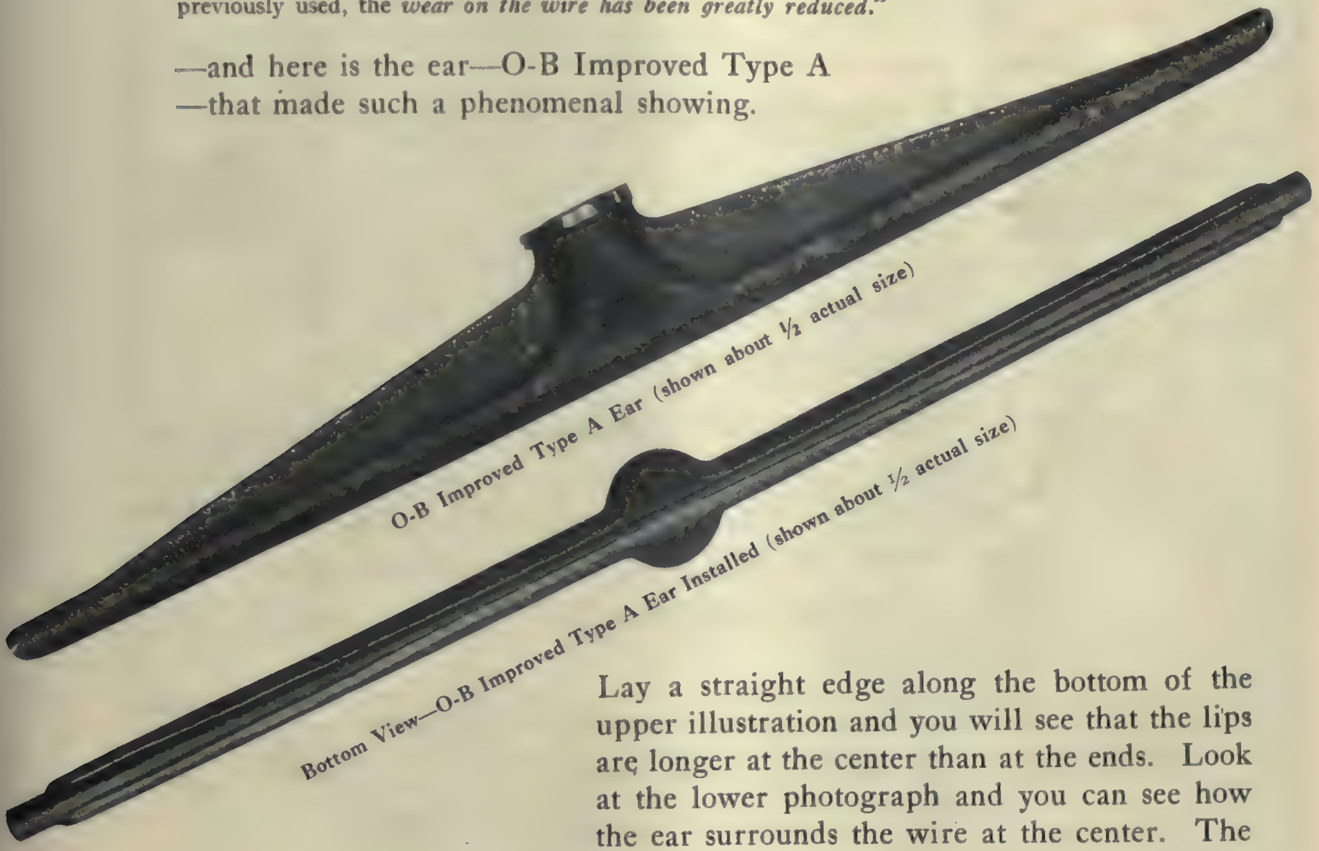
Trade Mark **Union Switch & Signal Co.** Trade Mark

SWISSVALE, PA.

From the proceedings of the American Electric Railway Engineering Association at Atlantic City, October, 1921.

> "The shape of the ear has also been found important. This seems to be borne out by tests made by one of the member companies which has on a special test section *increased the life of its wire 60 per cent* and the test when completed may show an even greater improvement. As is well known the trolley on a straight line wears more rapidly under the ear than between supports. This is due to two factors; one the pounding of the wire at the point of support which forms a hard spot in the line, two, the arcing when the trolley wheel passes under the ear. The test above mentioned was made by using a 15 inch clinch ear which practically surrounded the wire at the center of the ear. This was done to transfer the wear from the wire to the ear and as the results show, while these special *ears lasted fully as long* as the standard ears previously used, the *wear on the wire has been greatly reduced.*"

—and here is the ear—O-B Improved Type A
—that made such a phenomenal showing.



O-B Improved Type A Ear (shown about ½ actual size)

Bottom View—O-B Improved Type A Ear Installed (shown about ½ actual size)

Lay a straight edge along the bottom of the upper illustration and you will see that the lips are longer at the center than at the ends. Look at the lower photograph and you can see how the ear surrounds the wire at the center. The wheel remains in contact with the wire while it is making contact with the ear. Arcing and pounding—and consequently wear—are greatly reduced.

Add to this wear-reducing design the stubborn toughness of O-B Bronze and you have the O-B Improved Type A Cast Ear. Use it to cut your maintenance costs.

The Ohio B Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Insurance plus
Marsh & McLennan Service

A Worth While Saving

The service of Marsh & McLennan engineers results in a direct dollars and cents saving in insurance cost.

A large eastern corporation, for example, was able to reduce its insurance cost from $17.50 per thousand to $4.30 per thousand, by carrying out the recommendations of our engineering service.

We will be glad to outline this service to business executives who are interested in reducing insurance costs.

MARSH & McLENNAN
175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
New York
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Duluth
Columbus

San Francisco
Seattle
Cleveland

Winnipeg
Montreal
London

Dollar Saving Track Data

Includes plans and cross-sections of steel tie track as it is laid in Cleveland, Harrisburg, St. Joseph and six other cities. Also costs, photos and blue prints.

Read how the P & O saved the old concrete and $3.99 per foot—how Mr. Wolfe's track, laid in 1911 has cost only 43 cents per foot per year, without maintenance.

Prepared for
Executives and operating officials. Please ask for it on your letterhead.

The International Steel Tie Co.
Cleveland, O.

Few Companies with prospective track construction are missing this—

The International Steel Tie Company
Cleveland

Use the form

International Steel Tie Company
Cleveland, O.

Mail the data folder to

Name ....

Title.......... *Company*..........

City.......... *State*..........

It Is A Recognized Fact That The Well Lighted Town Is The Best Business Town

Light attracts business.

Light promotes the buying impulse. It quickens the pulse. It is the most powerful element directly affecting business. Without it—stagnation—nothing.

With it—action—everything.

ELRECO
Combination
POLES

are the answer to the demand for light at least cost. For the town which has little money to spend—for the Street Railway which wants supports for its span wires *at low cost*—

ELRECO Combination Poles offer a logical low-cost solution of the problem.

Sell your city the idea of a "White Way," with lamps, service wires and railway span wires mounted on Elreco Ornamental Combination Railway and Lighting Poles.

It is good business for all concerned and, as many cities have learned, nothing but a little salesmanship and *action* is required to carry the idea into accomplished fact.

We will gladly co-operate in drawing up plans and preparing estimates. Send for booklet.

The Electric Railway Equipment Co.
Cincinnati, Ohio **30 Church St., New York**

STOP!

Type B
Push Button

Say it with
FARADAY
Car Signals

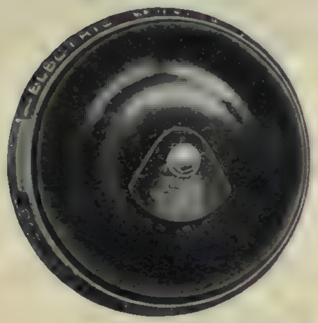
Type A
Push Button

Patrons do not like to depend on the conductor's memory. Neither do they like the gymnastics sometimes necessary to attract his attention to their approaching stop. And many passengers dislike to leave their seats ahead of time in order to notify the motorman. They much prefer to press the Faraday button which tells the operator when and where to stop.

Faraday High Voltage Car Signal Systems permit the use of buzzers, vibrating or single stroke bells or a combination of both on the trolley circuit. Faraday Signal Systems are supplied in several types, all of which employ the same mechanism which reduces arcing to a point where it is not sufficient to damage the contacts in any way. Approved by the National Board of Fire Underwriters.

Specify Faraday for subway, elevated, interurban, safety cars and trackless trolley busses.

For auto busses specify Faraday Battery Signal Systems.



No. 21022 Single Stroke Bell

ELECTRIC SERVICE SUPPLIES CO.
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA	NEW YORK	CHICAGO
17th and Cambria Streets	50 Church Street	Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh
Canadian Distributors:
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver

No. 19587 Vibrating Bell

No. 22181 Resistance Panel

No. 19403 Buzzer

Phono-Electric in Service 12 Years Without a Break

So Says W. H. Edmunds of the Denver & Interurban Railway

He also states:—

"That after twelve years' operation, we still have our first break in the wire to occur and not a foot of Phono-Electric has been replaced, although operating from 9,000 to 12,000 trains annually."

Continuous Operation is Assured

Note that this record—although not unusual for Phono-Electric—was made on High speed interurban heavy train service where continuous operation is of utmost importance; where trolley wire breaks would undoubtedly mean temporary supension of schedule — 'tis here that Phono-Electric's defiance to undue wear and tear places a value far above the cents per pound calculation—it stays!

Phono-Electric—its answer to why, is WEAR!

Bridgeport Brass Company
Bridgeport Connecticut

A Car is No Older Than its Passenger-Interchange Speed

peed in getting over the line isn't secured just because you have plenty of motor capacity on these older, bigger, rush-hour cars.

It's also necessaary to have the right kind of doors of the right width and in the right places, with the right arrangement of aisles and loading spaces.

And it's even more necessary to have these doors and their steps open and close quickly, safely and laborlessly for immediate stops and immediate starts because rush-hour capacity is a matter of split seconds once the cars are in the downtown area.

No need to put your costly investment on the retired list when National Pneumatic Door and Step Control, National Pneumatic Door and Step Operating Mechanisms, Motorman's Signal Lights, Safety Interlocking Door Control and Multiple Unit Door Control will rejuvenate them for so much less than the cost of a new rush-hour car.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

N-L CAR EQUIPMENT

Signals Sanders Ventilators
Selector Switches

The cars shown on the opposite page are equipped with N-L Indicating Signals, N-L Sanders, N-L Ventilators, N-L Selector Switches. There are lots of other cars equipped the same way.

N-L Indicating Signals are essential for eliminating rear end hazard between cars and from day to day becoming more and more a necessity for traffic reasons. You will include them in your specifications if you are fully informed on them.

N-L Sanders are used throughout the country to a greater extent than any other make. We know about Sanders. Let us tell you how you can save sand. How you can get the ultimate in safety. We make pneumatic, electrical and mechanical Sanders. Especially we want to tell you about our mechanical Sanders as applied to Safety Cars.

N-L Ventilators. Observe the neatness of appearance. Thousands in use and are well tried out. Users specify them over and over. That is a good recommendation. Nothing better can be offered as a reason for including them in your specifications.

N-L Selector Switches. Use high wattage lamps, one circuit to a car. The Selector Switch takes care of burnouts and keeps your lamp lighted.

During 1921 more than 2000 Mechanical Sanders, 2700 Ventilators and 600 equipments of Indicating Signals were furnished mostly for new cars.

Specify N-L Equipment for New
and Rebuilt Cars

THE NICHOLS
8404 Lorain Avenu
N-L Products Manufacture
RAILWAY & POWE
133 Eastern Avenu

"Go S-L-O-W!"
Says this N-L to the car behind-
Says this N-L to the automobile.
BUFFALO, N.Y.

N-L Indicating Signals

As a responsible member of the driving fraternity you feel it incumbent to signal following traffic. You expect it from the driver ahead. *Your Street Car can also do it.*

And when your street car is doing it, it is smoothing out traffic problems in the same way you are doing when doing your best to make it safe for everybody,

It is then acepted into the fraternity as a full-fledged member, doing its best to avoid accidents, *just as you are yourself.*

The truck driver may have no respect for your Street Car, but the red light—ah, that is different.

Your street car may as well have his respect and the goodwill of yourself and the other drivers. *You need it all.*

During the past year more than three hundred Safety Cars have been equipped with N-L Indicating Signals.

Some Safety Cars have been equipped for several years. More than four thousand miscellaneous cars are equipped, some of them for more than six years.

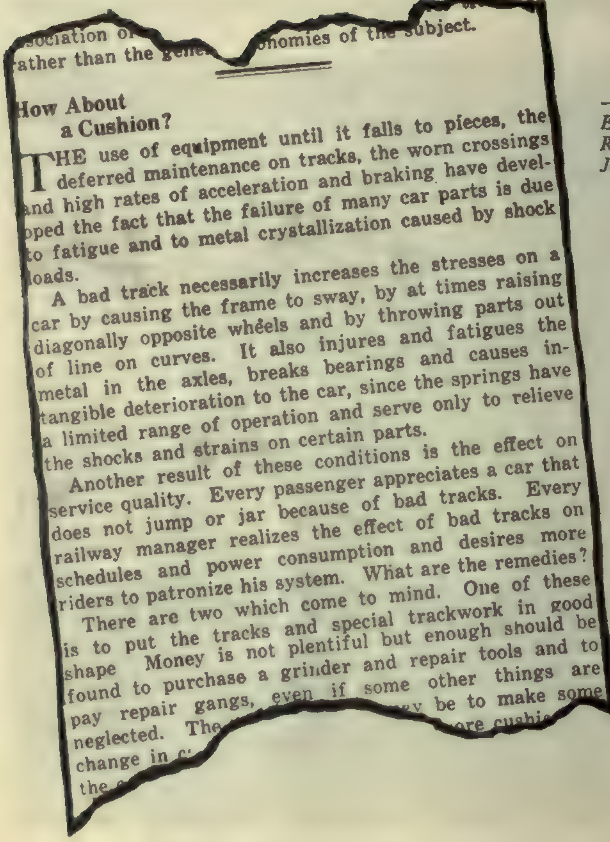
The idea has survived.

It has stood the test of practical utility.

Traffic conditions are responsible.

NTERN COMPANY
veland, Ohio

Sold in Canada by
GINEERING CORP., Ltd.
nto, Ontario



sociation o nomies of the subject.
ather than the gene

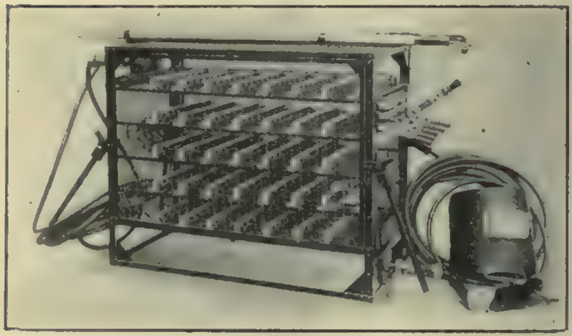
How About
a Cushion?

THE use of equipment until it falls to pieces, the
deferred maintenance on tracks, the worn crossings
and high rates of acceleration and braking have devel-
oped the fact that the failure of many car parts is due
to fatigue and to metal crystallization caused by shock
loads.
A bad track necessarily increases the stresses on a
car by causing the frame to sway, by at times raising
diagonally opposite wheels and by throwing parts out
of line on curves. It also injures and fatigues the
metal in the axles, breaks bearings and causes in-
tangible deterioration to the car, since the springs have
a limited range of operation and serve only to relieve
the shocks and strains on certain parts.
Another result of these conditions is the effect on
service quality. Every passenger appreciates a car that
does not jump or jar because of bad tracks. Every
railway manager realizes the effect of bad tracks on
schedules and power consumption and desires more
riders to patronize his system. What are the remedies?
There are two which come to mind. One of these
is to put the tracks and special trackwork in good
shape Money is not plentiful but enough should be
found to purchase a grinder and repair tools and to
pay repair gangs, even if some other things are
neglected. The be to make some
change in
the

—from the Electric Railway Journal

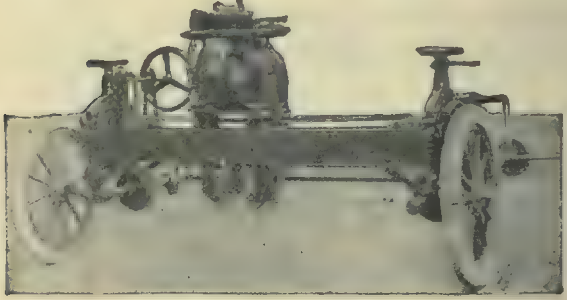
Count the Cost!

Isn't it worth a little research on your part to figure out the actual money loss caused by rough track which discourages traffic and racks cars to pieces? Just make a conservative estimate of these two losses, then balance them against what you think you've saved by cutting down on track maintenance. We'll wager that the result is in red. Why let things drift this way when all authorities are agreed that track-work can be kept smooth and its life prolonged at slight cost, by welding and grinding?



"AJAX"
Electric Arc Welder

The most modern welder on the market, designed for the reclamation of rails and special work at lowest cost. Light, rugged and simple, it is especially adapted for the usual track crew organization. For use in all kinds of track welding or for general shop use.



"UNIVERSAL"
Rotary Track Grinder

An improved rotary grinder with valuable features such as a tilting grinding wheel, large rubber-tired derail wheels, and three point suspension of grinding wheel arbor-bearing for maximum stability. To smooth off surplus metal after welding.

Order Necessary Equipments Now!

RAILWAY TRACK-WORK COMPANY

3132-48 E. Thompson St., Philadelphia, Pa.

AGENTS:

Chas. N. Wood Co.	Electrical Engineer & Mfg. Co.	Atlas Railway Supply Co.	P. N. Wood
Boston	Pittsburgh	Chicago	New Orleans

?

Is This Service or *Is This Service*

Either is used as a means for transportation, but thinking people know there is a difference, a considerable difference, and the winter months bring a quick realization to the riding public that, after all, the only safe, reliable, comfortable and indispensable method of transportation for all seasons is the good old trolley car.

One of the vital factors in good trolley service is the overhead, and the severe conditions imposed by winter weather emphasize to the Overhead man that there is also a difference in overhead line materials, the same difference as between the trolley and the jitney. He specifies Drew Quality Overhead Equipment because he knows it is reliable, it is able to stand up under the most trying conditions, and it is not merely a "fair weather friend."

Many railway properties have proven to their own satisfaction the savings effected by the use of Drew Overhead Materials, especially when they have stopped to consider costs as a whole, i.e., initial cost of materials installed, plus maintenance and renewal costs. You, too, can convince yourself without any additional expense, because there is a guarantee back of Drew materials. Why not start now with an order for some of your overhead requirements and let us do our share in helping the trolley maintain its reputation for efficiency and reliability.

The Drew Electric & Mfg. Co.
Cleveland, Ohio

Agents

Hegeman-Castle Corp.,
343 So. Dearborn St., Chicago, Ill.

National Railway Appliance Co.,
50 E. 42nd St., New York City.

W. M. Lawyer,
383 Fayette St., Syracuse, N. Y.

Electrical Engineering & Mfg. Co.,
907 Penn Ave., Pittsburgh, Pa.

Railroad Signal Supply Co.,
Hackney Bldg., St. Paul, Minn.

J. F. Schaefer & Co.,
618 Dwight Bldg., Kansas City, Mo.

F. F. Bodler,
903 Monadnock Bl'dg., San Fransisco, Cal.

W. F. McKenney,
54 First St., Portland, Oregon.

Northern Electric Co., Ltd.,
121 Shearer St., Montreal, Quebec, Canada.

Some interesting statements from some Engineers well known in the C.E.R.A.

"Overall Specialists"

The service men who work with you on your lubricating prbolems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service

On a test it was found that satisfactory operation could be obtained with a minimum use of 4 oz. of ...... gear grease per 1000 miles and 8 pounds of oil per 1000 miles, both of above 4 motor equipments. As a comparison it was found that *same performance* could be obtained by using 8 pounds of TULC per 4 motor equipment per 2500 MILES. Previous cost of oiling was 86 cents per 1000 miles and present cost (with Tulc) 42 cents per 1000 miles.

The results from use of Tulc on our properties checks very closely (the above) the statement of 8 pounds per 4 motor equipment per 2500 miles.

"Considering the cost of waste and cost of labor in handling the differential greatly favors TULC."

"Labor cost about *one-third* handling TULC."

"Have been using TULC for 12 to 15 years and found it very satisfactory."

"Since using TULC have been free from bearing troubles and have *eliminated two oilers.*"

Don't take our word for TULC. Let us show you on your own lines. It will cost you nothing to investigate.

***The* Universal Lubricating Co.**
Offices: Schofield Bldg. **Works: Sweeney Ave.**
Cleveland, Ohio

TULC
A
LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs

U.

S.

Electric Signals

Operating cars on single track, without an efficient signal system, will cost you, sooner or later, a good round sum in damages when the inevitable accident occurs. Perhaps you have had one already. Look out for the next!

A very small amount invested now to purchase and install United States Electric Signals will be not only the means of preventing such a disastrous occurrence, but it will enable you also to speed up your line, to operate more cars on quicker schedules without double-tracking and without additional turnouts.

Get our estimate on a complete installation. You need signals!

and

Automatic Track Switches

Type 16

Quick acting electric track switches have become a real necessity in the operation of snappy, up-to-date service, especially where safety cars are used.

Our new Type 16 switch, recently placed on the market after exhaustive tests of many months' service on several Massachusetts roads, is of simplest construction, yet so rugged and so well-protected that maintenance troubles and expense are practically eliminated. The trolley contactor mounts on standard ears—a factor which will appeal to experienced line-men.

Electric switches—good ones—save time of cars on the road. *Speed up.*

SEND FOR FULL DESCRIPTION AND PRICES

For Faster and Safer Service

U.S. ELECTRIC SIGNAL CO. WEST NEWTON, MASS.

United States Electric Signal Company
West Newton, Massachusetts

Representatives:
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign: Forest City Electric Services Supply Co., Salford, England

U.S. ELECTRIC SIGNAL CO. WEST NEWTON, MASS.

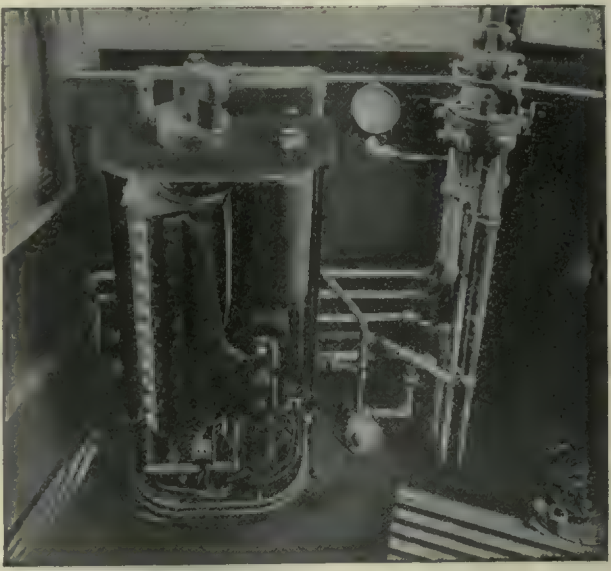
HERE'S THE TROUBLE, and HERE'S THE CURE

"All maintenance men are familiar with the difficulties experienced with new air actuated equipment on account of scale and dirt from the new piping collecting at undesirable points. Many of these difficulties can be avoided by a careful installation of the pipe. Before pipe is assembled it should be thoroughly hammered to loosen all scale or dirt, all fins and burrs tending to restrict the opening should be cut away and the pipe should then be blown out to remove all such matter. This treatment should be given before the pipe is in place, for otherwise it is apt to result in the deposit of this matter in some part of the pipe system or in the appliances connected thereto*..."

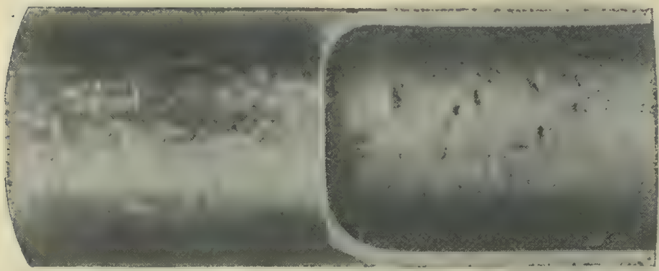
From an article by Joseph C. McCune, Westinghouse Traction Brake Co., entitled, "Installing Safety Car Control and Air Brake Equipment", Electric Railway Journal, June 19, 1920.

"NATIONAL" Welding-SCALE FREE Pipe having clean, smooth surfaces both inside and out, is ideal for installations on electric railway cars, and can be depended upon to greatly reduce the troubles caused when welding-scale is present.

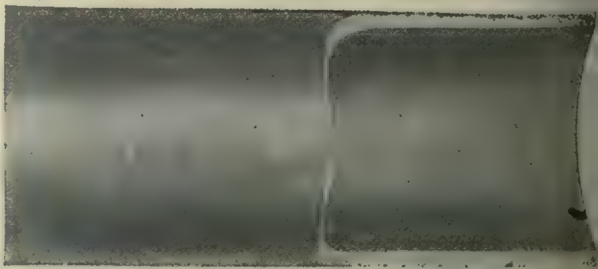
All "NATIONAL" Butt-weld Pipe, sizes ½ to 3-inch, is now made by the scale-removing process. The advantages resulting are described in a "NATIONAL" Bulletin No. 7—Manufacture and Advantages of "NATIONAL" Welding-SCALE FREE Pipe. Everyone interested in the installation of piping for conducting air, in any type of service, should have a copy of this Bulletin. Ask for your copy today.



A typical installation of "NATIONAL" Welding-SCALE FREE Pipe on a modern street car.



Ordinary black butt-weld pipe showing characteristic coating of welding-scale



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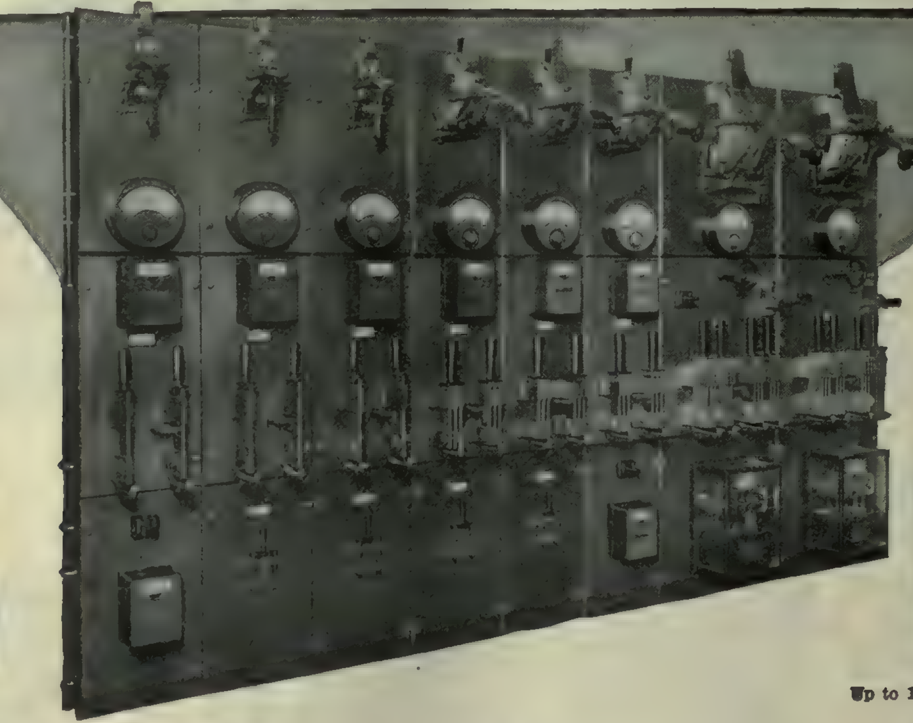
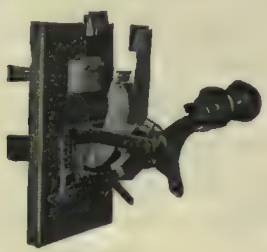


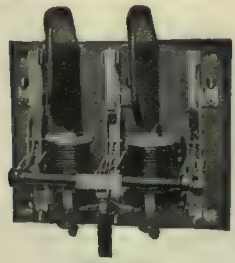
Type CK-3
Up to 6000 amps., 650 volts

Type CP-3
Up to 1200 amps., 650 volts

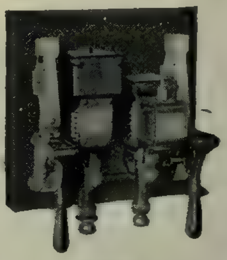


Type CK
Up to 6000 amps., 250 volts

Type CK-2
Up to 10,000 amps., 650 volts



Type CG
Up to 300 amps., 550 volts



Type CP
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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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C. E. R. A. Engineering Council Has Made Good Start

THE close of a very good year and the start of a promising new year were marked by the annual meeting of the Central Electric Railway Association last week. Perhaps the outstanding accomplishment under the administration of President A. C. Blinn was the actual inauguration of the long-talked of meetings exclusively for the engineers of the central territory. Similarly, one of the important things that will probably be accomplished under the capable leadership of President S. W. Greenland is the completion of the organization and scheme of procedure of the council. The important thing this past year was to get the engineers' meetings started. This has been done, and the several local section meetings and the one general session held have served to stimulate a healthy and instructive expression of experience and opinion on pertinent questions confronting the engineers.

However, there must still be some system planned whereby the discussion of each section may be brought down to definite conclusions, the conclusions of the several local sections on a subject studied jointly, and a final report drawn by a standards committee of the council, or some such body, looking toward the formulation of definite "recommended practices" or "standards" of construction based on the consensus of thought of all the engineers of the central territory. This is the thing that remains to be done to make the Engineering Council the success that it was hoped it would be. In some such way there must be avoided the repeated discussion of the same topic with divergence of views always in evidence and without making any noticeable headway. The local section meetings have already proved their worth in their stimulation of new ideas, and if a plan can be formulated now so that the meetings will be "getting somewhere" in addition to just discussing problems, the idea of the Engineering Council will have been made completely successful. This task falls in the main to the willing hands of President Greenland and second Vice-President Harry Reid, who is ex officio chairman of the Engineering Council. The chairmen of the local sections appointed during the latter part of last year will be continued through this year according to the general understanding—a further assurance of success.

Another Summer Cruise for C. E. R. A. Members

WHEN anything has been as completely enjoyed by all in attendance and has afforded as perfect a setting for a convention as the Great Lakes cruises of the Central Electric Railway Association, it was only to be expected that the association would unanimously indorse a repetition next summer. The boat trip really is a great event for this association. It affords a degree of pleasure and absolute isolation from the heavy cares of the year that can be gained in no other way. And more important, perhaps, this rest and leisure, in company with many other railway men, furnishes an opportunity for discussion of common problems or exchange of ideas and advice that is of inestimable value to the companies. Furthermore, the business program of the convention is just enough of serious purpose to keep one from forgetting altogether the work left behind that must be returned to.

So make a mental reservation now for a few days' engagement off the job at the end of June, for you will find it "the most delightful event of the year." And as usual, the association will be glad to include in the party railway men from any part of the country.

Why Eliminate Waste? Why Standardize?

LAST fall the Federated American Engineering Societies issued a committee report on the elimination of waste. If this report has caused any reaction in the electric railway field the editors of this paper have, unfortunately, seen no evidence thereof. But even though there was no specific reference to the electric railway industry, even though there was apparently no direct appeal to electric railway men, there stood out from the report for those who would see a real message, a big idea, in conservation of man power and materials for all industry. (See review of this report, ELECTRIC RAILWAY JOURNAL, Nov. 17, 1921, page 1152.)

There have been some who, lately, have seen in this report a false indictment of management. That, it appears, is a rather distorted view of the purport of the report. Rather there appears on close study an analysis, a portrayal, of what management, with its brains, can do to eliminate many of the wasteful practices of American industry—whether it be in the use of man power, of materials, of methods, or what not. There are as plainly pointed out opportunities of labor to assist in a constructive program of getting things done in a more effective order.

But the report is fundamentally the striking evidence of a broad constructive policy for the benefit of American business and American men and women. To becloud the main issue is, as one noted engineer has said, a "dis-service" to the nation.

There are two main concrete suggestions which electric railway men can get from a close study of this report. One of these is how to analyze their own work to see how to eliminate whatever waste exists. This can be learned from a study of the way in which the six "test industries" were analyzed. The other is how best to approach the problem of standardization; in other words, what standardization really means.

These two subjects, the elimination of waste and the adaptation of the principle of standardization—so far as practicable—in American industry, are the two most potent factors for the maintenance or increase in the present American standard of living. If man's effort, by reduction of lost motion, is increased 25 to 30 per cent, he and his fellows benefit directly in proportion. If capital invested in finished product for the market is called upon to maintain a smaller number of types, it can automatically expand its usefulness.

Standard Specifications Would Appear to Benefit Everybody Concerned

IT HAS been generally taken for granted that when a group of competent engineers or others get up a set of specifications for a material, a device or a process commonly used they have accomplished something. That this assumption is warranted can be seen from a moment's consideration. Obviously the product of their deliberations is the result of the best thought and experience available. The thing or practice specified must, therefore, be better than the average thing or practice in use. If the specification is generally adopted the result will be a money saving. But if there is a failure to adopt a standard, it is partly a reflection upon the competency of the framers thereof.

In a recent number of the "Question Box," published monthly in *Aera* by the American Association, a topic raised for discussion was the desirability of standardizing small track supplies, such as bolts, spikes, nut locks, etc. A surprising result was the statement by several experienced railway men that such standardization is undesirable. In the opposite belief this paper in 1920 secured from Howard H. George, and published, a series of specifications of track details with technical explanations. The series was well received and was believed partly to fill a long-felt need. The Engineering Association committee on way matters has for years had the standardizing of these details under consideration and will, it is hoped, in due course make some definite recommendations. The result will be a better grade of supplies at the same or lower cost.

Of course, the principal valid objection to standardization is that it will stop progress. This means that it should be attempted only when it does not prevent real development. Legitimate standardization, therefore, is synonymous with judicious standardization, which in turn means applying common sense to it.

Even in New York Traction Conditions Are Improving

THE electric railway fare situation in New York City has long been recognized as the worst among the large cities in the country. No increase in fare has been permitted except that of a charge of 2 cents for transfers on the surface lines. But developments during the past week indicate that conditions are improving, even though the new Transit Commission has not yet had an opportunity to conclude its investigation and recommend a remedy. Of course, the companies cannot be considered yet as prosperous. It is not a sign of affluence for a man to be bankrupt but able to work off a portion of his debt, or for one who is nearly bankrupt to say that he thinks now that he can take care of his notes when they become due. But even these conditions are better than those of but a short time ago. The result has been brought about by economies and reduced costs of materials and labor, plus, in the case of the surface lines, a virtual increase in fare, brought about by the break-up of the lines.

Coincident with this comes the discovery by a legislative committee appointed to investigate taxes that the utilities are the most heavily taxed of any kind of industry, and the electric railways the most heavily taxed of any utility. In fact, at present, some electric railways which otherwise would show a profit are being asked to pay not only all of their net earnings, but two, three and four times that sum as taxes, and it was found that the taxes on electric railways are nearly four times as great as the corresponding taxes on manufacturing companies. If local real estate taxes are taken into account, electric railways in New York State operating at a profit pay some 44 per cent of their net income in state and local taxes. It seems that it is necessary only to call attention to this situation in order to bring about a reform; another sign that conditions are better.

Boston Makes a Remarkable Showing

ONE of the first annual reports to appear this year is the earnings statement of the Boston Elevated Railway. It is a mighty encouraging document. It speaks wonders for the management of that property and bears out in large degree the prediction in the Electric Railway Journal about a year ago that in the period of post-war deflation the electric railways would most likely come into their own again. This is said advisedly, of course, for many companies are still sorely beset, but even the most hardened pessimist cannot but marvel over the showing at Boston.

It will be recalled that at the end of the first year of operation of the road under the public trustees an operating deficit of about $5,000,000 had accumulated. During this time a 5, then a 7 and finally an 8-cent fare was in force. This accumulated deficit was met from the reserve fund and by general taxation in the cities and towns served by the railway. In the second year, with a flat 10-cent fare in force, the revenues practically met expenses. In the calendar year just closed receipts exceeded expenditures by about $1,117,000. The basic fare at Boston is still 10 cents, but the number of lines being operated at 5 cents is being increased constantly. Few suburban centers now remain in metropolitan Boston where it is not possible to ride within the local community for a 5-cent fare.

The trustees of the company are, of course, elated. They have every right to be. But they warn the public that under the provisions of the public control act the general 10-cent fare cannot be replaced by a lower fare until repayment has been made to the cities and towns of the amounts advanced by them to meet the deficits of the first year of public operation. In looking ahead, however, the trustees see on July 1 next prospects of surplus receipts of about $500,000 after the payment of the balance due the reserve fund. Under the statute this surplus must be used in reimbursing the cities and towns for the advances they made in meeting the previous deficits. The prospects would therefore seem bright of paying off the balance of the loan in 1923.

A particularly pleasing feature of the matter is the acknowledgment which this wonderful showing by the management has received in the daily press. In the dark days when the deficit was piling up the tendency of the press was anything but lenient, but General Manager Dana and his associates, ridiculed, sneered at and at times vilified, have, as the Boston *Post* says, come through with a very satisfactory record. Much still remains to be done. Of this Mr. Dana and the trustees are cognizant, but the fact remains that the showing for 1921 is in many respects a truly remarkable one.

The California Resolutions Regarding "Bus Transportation"

LAST WEEK the California Electric Railway Association adopted the resolution reprinted herewith and distributed it quite widely throughout the electric railway industry of the entire country.

To the editors of Electric Railway Journal and Bus Transportation, the action taken by these leading and influential electric railway officials of California indicates two outstanding points, though possibly not of equal importance. The first of these is that there is a critical and fundamental problem facing the electric railway industry today in this question of the bus and just as critical and fundamental a problem facing the bus transportation industry. The other point is that the California men, who have been acquainted for years with the purposes and policies of Electric Railway Journal, have misconstrued or have gained an entire misconception of the facts and purposes connected with the starting of Bus Transportation.

There is perhaps a special reason why men from California should take a viewpoint apparently so at variance with many, if not most, others. Competition between rail and bus is more bitter in California than anywhere else because of the large number of automobiles, the wonderful climate, the long, smooth, improved—and inviting—highways, and also because of the recognized injustice of jitney competition in the early days. It will be recalled that the advent of the "jitney" is credited to Los Angeles on July 1, 1914. Since that time, in a period when the population of Los Angeles has doubled and the traffic increase would normally, according to past history, be fourfold, the number of street car riders has not materially increased. With a situation so tense and at a time so critical, it can be understood that California railway companies might not take the broadest view of the situation.

But it is not in California alone that there is a problem. Everywhere in this country electric railway operators are confronted with transportation problems in which the possible place of highway transportation has an important bearing. Opinions on the bus by railway men vary from a real and growing application in both rail and non-rail territory to an uncompromising position of demanding that the word "bus" and all that it stands for be relegated to innocuous desuetude. In the eyes of many—and with this group the editors of these two papers agree—the latter attitude is one in which personal prejudice has overcome sound judgment. But that a real problem exists before the railway industry as a whole in determining its attitude toward the bus is very apparent. It is to be hoped that the industry itself will not break up its present wonderful co-operation and united effort on its common problems. But views do vary on the question and discussions on the bus are becoming more and more frequent. The American Association devoted a session of its 1920 convention to the subject; the New England Street Railway Club on Feb. 2 discussed the bus most fully, and it is both timely and fortunate that the American Electric Railway Association has placed the bus at the top of its program for the Indianapolis Midyear Conference on Feb. 28.

Resolution of California Electric Railway Association Regarding the Publication of "Bus Transportation" by the "Electric Railway Journal"

Whereas, the Electric Railway Journal has been supported by the electric railway industry of the United States and the co-operation of such industry and the manufacturers of electric railway supplies and equipment has made it possible for such Journal to continue and be recognized substantially as the official mouthpiece of the electric railways in this country; and

Whereas, the publishers of said Electric Railway Journal have seen fit to foster as a part of their enterprise, a publication to be known as Bus Transportation, dealing largely with the automobile industry in the United States, and, particularly, with reference to gasoline propelled motor vehicles carrying passengers and freight for hire in direct and unfair competition with the electric railway carriers of the country; and

Whereas, the result of such publication will be unfavorable to the interests of the electric railways of this country; now, therefore

Be It Resolved by the California Electric Railway Association and the undersigned members of such Association, that the action of the publishers of said Electric Railway Journal in starting said automobile publication is not to the best interests of the electric railways of the United States, and this Association and its members are resentful of said action and the support so given by the publishers of said Electric Railway Journal.

CALIFORNIA ELECTRIC RAILWAY ASSOCIATION,
By W. R. Alberger, President.
W. V. Hill, Manager.

Los Angeles Railway Corporation, By W. E. Dunn, V. P.
San Diego Electric Railway Co., By W. Clayton, V. P.
San Francisco-Oakland Terminal Railways, By W. R. Alberger, V. P.
Market Street Railway Co., By Wm. Von Phul, Pres.
Pacific Electric Railway Co., By D. W. Pontius, V. P.
Southern Pacific Company, By Paul Shoup, V. P.
Pacific Gas & Electric Company, By P. M. Downing, V. P.
Bakersfield & Kern Electric Railway, By A. G. Wishon, G. M.
Sacramento Northern Railroad, By Geo. F. Detrick, Pres.
San Francisco-Sacramento Railroad Company, By H. A. Mitchell, V. P.
Peninsular Railway Company, By F. E. Chapin, G. M.
San Jose Railroads, By F. E. Chapin, G. M.
Central California Traction Co., By F. W. Webster, G. M.
Stockton Electric Railroad Co., By F. W. Webster, G. M.
Fresno Traction Company, By F. W. Webster, G. M.
Visalia Electric Railroad Co., By F. W. Webster, G. M.
San Francisco, Napa & Calistoga Railway, By C. E. Brown, V. P.
Petaluma & Santa Rosa Railroad Company, By E. H. Maggard, V. P.
Santa Barbara & Suburban Railway, By W. A. Brackenridge. Pres.
Union Traction Company, By S. W. Coleman, Pres.
San Diego & Arizona Railroad Co., By A. T. Mercier, G. M.
Northwestern Pacific Railroad Company, By W. S. Palmer, Pres.

San Francisco, California.
January 23, 1922.

Why We Started "Bus Transportation"

As to the second point emphasized by this resolution, the editors have no desire to quarrel with their long-time friends from California, nor do they suppose these friends desire to quarrel with them. But there is evidently an honest lack of understanding of the facts and purposes concerning Bus Transportation. To start with, it should be emphasized that it was with a definite desire to be of even greater service to the electric railways and at the same time to render a service to those in the bus transportation business who have a real purpose of public service as their guiding motive that Bus Transportation was started. The editors of Electric Railway Journal appreciate the compliment in the first paragraph of the resolution as to the position which the Journal has been privileged to occupy in the industry and trust that it has rendered a real service. Bus Transportation is merely an extension of that service in response to a very evident demand.

While Electric Railway Journal is an independent and not an official publication, it developed as a part and product of the industry and with the benefit of the thinking and advice of the leading men in the industry. In the same spirit, and as the same sort of outgrowth of the transportation industry, BUS TRANSPORTATION has been naturally developed. In other words, BUS TRANSPORTATION is published not because the McGraw-Hill Company or its editors alone believed it to be sound for the industry, but because the electric railway men themselves, as a group, and the leading figures of the bus transportation industry have developed their own thinking to the point of desiring such a publication by a responsible organization which will emphasize the sound principles of the transportation business.

BUS TRANSPORTATION is not a publication "dealing largely with the automobile industry in the United States, and particularly with reference to gasoline-propelled motor vehicles carrying passengers and freight for hire in direct and unfair competition with the electric railway carriers of the country," but is rather one dealing with the transportation industry as to the proper application of highway vehicles to the transportation of passengers in urban and interurban areas in co-ordination and co-operation with such existing transportation agencies as may be operating in those areas. The policy of the paper is to foster unified operation in any given area and to deprecate and show the folly of the unfair and unregulated competition which has existed in many places.

Briefly, the editors of ELECTRIC RAILWAY JOURNAL have been for some time presenting bus information in the JOURNAL columns and, while this was in response to reader demand and to the signs of the times, it was limiting the strictly railway service which could be rendered and at the same time limited the bus information which could be supplied. Furthermore, it did not and could not adequately reach the independent bus transportation men who wanted a transportation publication. To start a separate publication seemed, after much careful study, to be the best solution. Many leaders of the electric railway industry were consulted as were also leading bus men. Those whose views were obtained were unanimous in commending the new undertaking, with the exception of one of the leading Pacific Coast representatives, whose comment, however, was not received until nearly Jan. 1, more than two months after the preliminary announcement on Oct. 29. Letters from many of these men were printed in the ELECTRIC RAILWAY JOURNAL in the issues of Dec. 10 and Dec. 31.

The publication of BUS TRANSPORTATION was thus undertaken with the apparent encouragement of most of those who would be interested and in the desire to render real service. There was no illusion regarding making money with the new venture, for some time to come, at least. BUS TRANSPORTATION was issued as a section to ELECTRIC RAILWAY JOURNAL to JOURNAL subscribers because it was felt that subscribers whose subscriptions had not expired should continue to have the bus information service, if they desired, without additional payment for the rest of the subscription term. That the offer has been appreciated and BUS TRANSPORTATION apparently desired is indicated by the fact that more than one-third of the JOURNAL subscribers have requested and are receiving it on that basis. While that arrangement has advantages, also, from a postal standpoint in convenience and cost of mailing, these advantages are less important than any misconception of purpose and it can easily be arranged to do what some Californians since the adoption of the resolution have suggested, namely, to "divorce" the two publications so that there will be no doubt that each stands on its own feet. This does not mean any change in staff or management, of course, nor of editorial policy, for, as the editors see it, there is only one sound policy which is possible. If the same company can operate buses and cars satisfactorily or the same interests operate steam and electric railroads with fairness to the public, it is hard to see why the same publishing company cannot properly issue a bus transportation paper and an electric railway paper.

It is gratifying to the editors, in the viewpoint they have taken, to find that the sentiment in the Central and Eastern territories, so far as it can be learned within the last four days or since they have had knowledge of the resolution, is still in accord with the move which has been made. Comments have come to the editors during this time to indicate that the expressions of opinion shown Dec. 10 and 31 are unchanged and that BUS TRANSPORTATION is performing a real service.

There should be no doubt of purpose or fact. BUS TRANSPORTATION is published to help in finding the solution of the question: where does the bus fit in. By portrayal of fact, by encouragement of good transportation practice, by dissemination of information and by support of proper regulation and co-ordination of bus transportation services, the editors hope to render such service to both independent bus operators and railway men, whether or not active in bus operation, that the attitude of California railway men will be changed and that BUS TRANSPORTATION will be recognized everywhere as the constructive agent it is intended to be.

A Purpose Clearly Defined Is Already Half Accomplished

A LARGE part of the constructive thinking of the electric railway industry comes to a head in committee work—on the properties and in the local and national associations. To be effective this thinking must be well directed, otherwise, as has been aptly said, the result will be like that from trying to operate on a track a car with flangeless wheels.

The best corrective of aimless thinking is definition. This applies to the thinking of the individual, but especially to a group, like a committee, which is trying to think in unison. This point was raised in an editorial in the issue of this paper for June 18, 1921, under the caption "The Function of Every Committee Should Be Clearly Defined." The point is reiterated now because committee activities are well under way and the committees are endeavoring to "find themselves." It would be a profitable exercise for every member of every committee to put into from ten to twenty-five words the gist of what he believes his committee ought to accomplish this year. The definitions of all members of a committee could be combined and a composite picture of the purpose would be produced. If this were done, a greatly improved quality of production would result, as compared with what is possible with less aimful planning.

One of the committees recently devoted a well-attended all-day meeting to the job of putting into crisp form the items which seemed to demand attention according to the specifications of the executive committee. The time was well spent.

Governor Miller Believes A 5-Cent Fare Possible

IN A NOTABLE address on traction affairs before the Merchants' Association in New York City last week, Governor Miller declared that in his judgment the 5-cent fare in New York "can and will be preserved." This statement was made in a constructive way. The Governor explained at length that people could not get something for nothing and could not be carried for less than the cost for their transportation, including a proper return on the honest capital. But he expressed the belief that by the "elimination of unnecessary waste and costs you can preserve, in all probability, the 5-cent fare."

All will approve of Governor Miller's courageous attitude in dealing with the traction situation in New York, but the question of a proper fare for such a large city as New York, with its constantly increasing demands for more transportation, is a very big one. Broadly speaking, there are two ways of establishing in any community a fare based on cost of service. One is first to decide upon the fare and then to adjust the service so that it can be supplied for that fare. The other is first to determine the quality of service desired and then to set the fare so as to cover the cost of that service. Of course, there are practical limitations to the extent to which each plan can be followed. Too low a fare may compel so poor a service as to discourage traffic, while too elaborate a service may also drive away traffic because it will mean a fare so high as to warrant only necessity riding. Besides comfort and frequency of cars, the cost of railway service depends, of course, upon a large number of other factors such as length of ride, amount of taxes and other burdens assessed against the companies, traffic regulation and other matters largely within the control of the authorities, or a lower fare than would otherwise be possible may be obtained through the payment by the city of a subsidy in some form.

Tradition in New York, perhaps to a greater extent than in any other city, calls for a flat fare of 5 cents on the rapid transit lines, as well as on the surface lines in Manhattan where the passenger does not change cars. While there are many arguments from the standpoint of the city against a flat fare—such as that it discourages the development of various community centers—it would probably be very difficult from a political standpoint in New York to make a change from it to a distance fare, especially on the rapid transit lines. Nevertheless, one idea long held in New York about the flat fare has disappeared, *i.e.*, that 5 cents should carry a passenger on the surface lines from any point to any other point in the same borough, and there is of course no precedent of a 5-cent fare to cover a transfer between rapid transit and surface lines, except to a very limited extent in the Borough of Brooklyn, and this has now been abandoned.

In other words, circumstances have brought around in New York City, except on the rapid transit lines, a kind of crude distance fare, and it is probably owing to this fact more than to any other that the surface lines in New York have been able to get along as well as they have during the last few years on a 5-cent fare. Theoretically, this fare may be highly discriminatory in regard to the distance which a person can ride on different lines for 5 cents. Practically, the discrimination is not so great as appears at first sight, because the speed of the surface cars is so much slower than that on the rapid transit lines that long rides on the surface system are the exception. Governor Miller did not specify in his address whether he thought his proposed flat fare should include universal transfers, between the rapid transit and surface lines, for instance. If this should be in contemplation, it would be a step backward. Such a universal fare would undoubtedly have to be higher than if such transfers were not given and hence would discourage short riding on the surface lines. During the last few years persons have not only become accustomed to paying for a transfer, but such a charge can be justified on the ground that, other things being equal, it costs more to transport a passenger who makes a transfer from one car to another than one who does not. Whatever fare system is adopted in New York City as a result of the present inquiry, an effort should be made to preserve as much of the distance fare characteristics as possible.

Association Membership Appeal Based on Both Self-Interest and Loyalty

WHY should the membership of the American Electric Railway Association support the 1922 campaign for more members, which is about to be launched? There are many reasons, but particularly two: First, the larger the association the more will each present member get out of it; second, the industry needs to have everybody in its association if it is to present a united front.

And what can the present members tell the "prospects" as to reasons for getting out of the "prospect" class? There are plenty of them and they can be divided into two groups, namely, the self-interest appeals and the loyalty appeals. Of the former the most forceful is the service which the association renders in the way of information, and to the value of which the present members can testify. This can readily be shown to be worth all that membership costs, provided that the members make use of their privileges. Again, the adequate preservation of any business depends to some extent upon all of its constituents standing together, and the association is the agency through which the electric railway industry can obtain this unity of action. This might be called the self-preservation appeal. There is also a certain prestige which goes with membership in a national association, and this prestige is proportionately greater with the small companies than the large ones.

This act of standing together has an element of loyalty also. Whether the potential usefulness of the association is capitalized or not, there is a natural feeling on the part of individuals and corporation managements that their industry needs their support. They want to be a part of any co-operative effort which the others think worth while. Of course if they do not realize that they are part of an industry, then they must first be convinced of the soundness of the idea.

This year's committee on company and associate membership plans a canvass more comprehensive than any previously undertaken among the railway, manufacturing and allied interests. The temper of the meeting held at Pittsburgh last week was one of determination to do a good job. From the reports presented by the secretary, it was evident that the present status of the membership list is excellent, but that it is susceptible to considerable improvement. Let's all help improve it.

Automatic Substation Practice at Concord, N. H.

Local Traction System, Serving the Capital City of the Granite State, Utilizes Two Installations of Labor-Saving Type with Noteworthy Reduction in Operating Expenses at Small Investment Cost

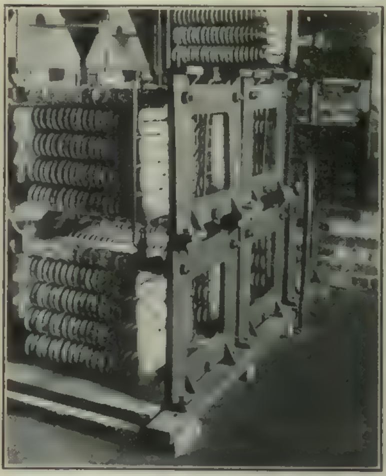
THE use of non-attendance substation equipment by the Concord (N. H.) Electric Railways illustrates the effectiveness of this method of power distribution from the point of view of economies in operating expenses. This railway operates about 31 miles of single track, with a maximum car schedule of twenty-five units and a minimum of fourteen. Serving the capital city of the Granite State and its surroundings, the road utilizes hydro-electric energy generated at Franklin, N. H., and the car service is operated by 600-volt direct current obtained from motor-generator sets and rotary converters located in substations formerly operated with manual control. An investment of $9,300 has yielded an annual saving in operating labor cost of $6,750. Thus the entire first cost of the automatic equipment will be liquidated in less than eighteen months.

Two substations are in service with non-manual operation. The first of these, located at the southern end of the city of Concord and called the "South End" substation, was installed in November, 1920. The other, or so-called "West Concord" substation, was installed in June, 1921, and is situated in a former steam-plant structure still containing reserve boilers and engine-driven generating machinery, located about 2 miles outside the urban center on the northern side of the community. The first substation is started manually and the second is equipped for full automatic operation.

The South End substation is housed in a section of the company's general repair shop building. The automatic equipment here was furnished by the Automatic Reclosing Circuit-Breaker Company, Columbus, Ohio. Power is delivered to this substation at 22,000 volts, and two sets of 150-kva. transformers supply current at 385 volts to two 300-kw. Westinghouse rotary converters. Two 22,000-volt, three-phase circuits connect the substation with the Franklin hydro-electric plant, nineteen miles north of the city, and also furnish energy for the lighting and power required at the Concord shops of the Boston & Maine Railroad, adjacent to the substation, and in addition for a number of towns north of Concord, including Newport, Warner and Bradford.

SOUTH END SUBSTATION AT CONCORD IS HOUSED IN A SECTION OF THE REPAIR SHOP

The equipment at the South End substation is standard for this service and is centralized on four switchboard panels, two of which are assigned to machine service and two to feeders. From this substation local service to the railroad shops is also controlled. Two feeder breakers, two machine breakers, two thermostat relays on the rotary converter bearings and two speed-limiting devices comprise the principal automatic equipment, and a striking feature of the installation is its compactness. The breakers occupy small square panel sections at the top of the regular panels, and very little difficulty was experienced in changing over the substation from all-manual operation. There has been no outlay for repairs since the installation went into service, and beyond a regular weekly inspection nothing in the way of overhauling has been required.


MOTOR STARTING RESISTORS IN WEST CONCORD AUTOMATIC SUBSTATION

Two Anderson time-clock switches are provided so that either rotary can be shut down at a predetermined hour, separately or together. These shutting-down times are governed according to anticipated traffic and work-car conditions, but usually in the small hours of the morning both units are out.

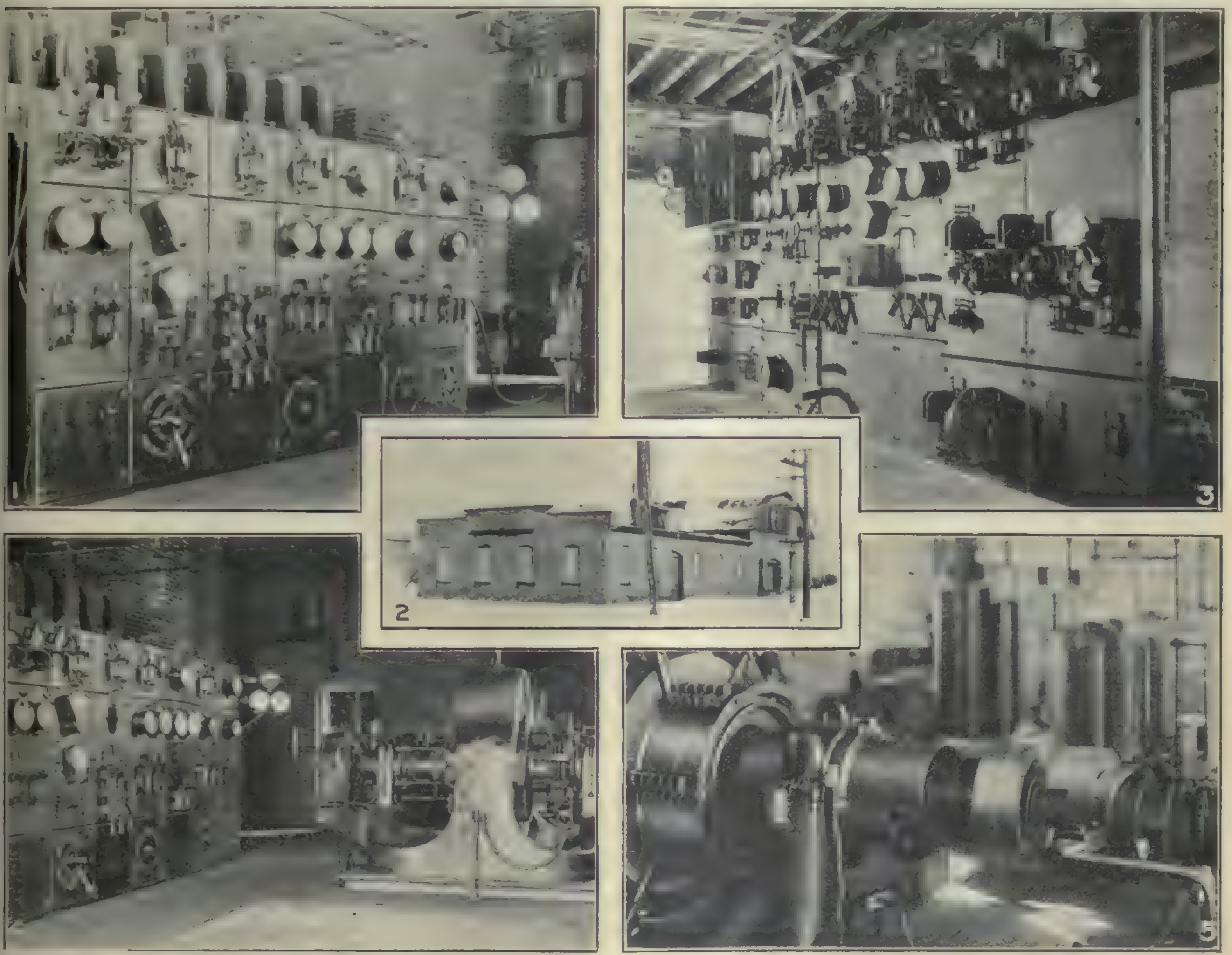
The cost of this automatic equipment was about $1,400 per unit, or $2,800 for the substation.

WEST CONCORD SUBSTATION IS FULL AUTOMATIC

The West Concord substation also receives power from the double 22,000-volt transmission line from Franklin. This is a complete Westinghouse installation, which occupies a space only about 15 ft. wide by 30 ft. long at one end of the auxiliary steam plant. One 300-kw. motor-generator set is in use here, the unit consisting of a 600-volt direct-current generator direct-driven by a 2,300-volt synchronous motor. This unit is provided with a shaft extension so that it can be engine-driven in emergency. Three 150-kva. transformers supply energy to the motor. One of the illustrations shows the direct-current end of the motor-generator and a "close-up" of the thermostatic switch attached to the bearings, arranged to shut down the machine in case of overheating. A general view of the switchboard is shown in another illustration and details of the relay panels in a third.

In this substation, as at the South End, existing equipment was utilized in the way of conversion apparatus, but four new switchboard panels were required. Two of these have been mounted at the left-hand end of the board and two at the right-hand end. The former are used chiefly to carry the automatic relays required for the various opening and closing operations, the latter being used in connection with the mounting of feeder circuit breakers.

The equipment which was used in the automatic operation of the substation is of the usual type, but a new feature has been added in the shape of a relay which opens the machine direct-current contactor before the alternating-current contactor, preventing arcing which otherwise might result from opening the 2,300-volt circuit under load. The installation is also designed so that by a slight change in wiring on the rear of the panels the equipment can be adapted at once to all-manual operation if desired. At one end of the board is mounted the motor starting resistance.



SUBSTATION VIEWS, CONCORD, N. H., ELECTRIC RAILWAYS

No. 1. Automatic reclosing circuit breaker equipment installed in substation.
No. 2. West Concord automatic substation.
No. 3. Automatic control apparatus at West Concord substation.
No. 4. 300-kw. rotaries and automatic switchboard apparatus installed in South End substation.
No. 5. This coupling provided for engine drive of rotaries in case of power failure.

Aside from the electrical changes effected in this substation, heavy wire screens were provided on the windows to prevent unauthorized entrance and possible danger to trespassers. An asbestos mat ¼ in. thick was also laid on a platform placed directly in front of the board.

The approximate cost of the switchboard equipment and control apparatus for this substation was $6,500, providing complete automatic operation. As at the South End substation, a weekly thorough inspection suffices.

The load requirements and prospects of the road do not indicate the necessity for installing further equipment for automatic service, but the results have been most satisfactory. The total cost of the two installations is about $9,300 (the translating and transforming equipment and original switchboard panels being utilized without additional outlay for such new apparatus). To operate these substations by hand involved three men in summer and four in winter, at a total annual wage outlay of $6,750 more than is now necessary. Besides this, the improvement in voltage regulation and reduced drop secured through welded bonding of the track have decreased the amount of energy purchased for the southern suburban line service from the Manchester Traction, Light & Power Company to a large extent. J. B. Crawford is general superintendent of the Concord Electric Railways.

The American Engineering Standards Committee has approved as tentative "American standards" the specifications of the American Society for Testing Materials for cold-drawn bessemer and open-hearth steel automatic screw stock, and methods of chemical analysis of manganese bronze and bronze metal.

New York Electric Roads Pay High Taxes

Investigation by a Legislative Commission Shows that Under the Present Complex System of State Taxation the Electric Roads Pay a Much Larger Percentage of Their Net Income in Taxes than Other Kinds of Business

By Frederick C. Mills
School of Business, Columbia University

AN INVESTIGATION just completed by the joint legislative committee on taxation and retrenchment of New York has revealed certain facts of general interest concerning the condition of public service corporations in New York State. The statistical report of the committee, which was issued on Jan. 25, presents an analysis of the burden of state and local taxes on the chief classes of public utilities and compares the tax burden borne by these groups with that borne by financial institutions and business corporations. Some startling variations in tax burden have been brought to light by this study.

Corporations doing business in the State of New York are subject to a variety of taxes. Business corporations (*i.e.*, mercantile and manufacturing corporations) are subject to a straight tax of 4½ per cent on their net income, plus local taxes on real property. National and state banks and trust companies pay a tax which amounts to 1 per cent on their capital, surplus and undivided profits, together with taxes on real property. Taxes on public service corporations constitute a system of considerable complexity. The State imposes on steam railroads and on telephone and telegraph corporations a capital stock tax, the tax rate for a given corporation depending upon the dividend rate, the relation of assets to liabilities, and the average price of the stock sold. In addition, these two classes of corporations pay a tax of ½ per cent on their gross intrastate earnings, a term which has been defined to mean earnings from business originating and terminating within the State. Gas and electric companies are not subject to the capital stock tax, but pay to the State ½ per cent on gross earnings, plus 3 per cent on the amount of dividends declared in excess of 4 per cent. Electric railways (not including underground electric railways, which are taxed upon the same basis as steam railroads) do not pay the capital stock tax. The gross earnings tax for this group is at the rate of 1 per cent, and they pay a tax of 3 per cent on dividends in excess of 4 per cent.

LOCAL TAXES MUST BE PAID ALSO

In addition to these state taxes all public utilities are subject to two local taxes, a general franchise tax and a general property tax. The basis of the former is the value of the tangible property in the streets, highways and public places, plus certain intangible elements, the value of the latter being determined annually by the State Tax Commission. Considerable litigation has arisen in connection with these special franchise valuations. The general property tax is levied upon all real and personal property, excluding that which is assessed with the special franchises.

Merely to enumerate these taxes gives some idea of their complexity, though it does not indicate all the difficulties involved in their administration, both for the tax authorities and for the corporations subject to them.[1] The objects of the legislative committee on taxation were the simplification of this complicated tax system and, so far as possible, the equalization of the tax burden.

In the determination of the tax burden a double problem was involved. It was desired, in the first place, to determine the relative weight of the tax burden on different classes of corporations. It was also essential to determine how the present system of taxes affected the different individual corporations within a given group. The statistical investigation, the results of which are now available, was undertaken with this double object in mind. Net income was adopted as the best available standard of tax-paying ability. For each class of corporations, therefore, the amount paid in taxes has been expressed as a percentage of net income, though the original levy may have been upon an entirely different base. In making the comparison on this basis the committee points out that net income, as used for business corporations and financial institutions, is not in all respects identical with the net income of public service corporations. It is held that general comparison is possible in spite of these slight differences, but that refined comparison would be out of order.

TABLE I—GROUPS OF UTILITIES CONSIDERED, WITH NUMBER OPERATING AT PROFIT

Class of utility	Total Number of Corporations	Number Operating at a Profit	Percentage Operating at a Profit
Steam railroads	60	43	71.5
Electric railways	56	34	60.7
Telephone and telegraph	66	62	94.0
Gas and electric	108	97	89.8
Total	290	236	81.5

As business corporations are now taxed upon a net income basis no problem was presented by this class. Data regarding financial institutions were secured by means of questionnaires sent to all banks, trust companies, investment companies and savings banks in the state. Replies were received from 93 per cent of the total number in the State. The ratios as finally worked up for this group were based upon averages for the three years 1918, 1919 and 1920. The primary sources of information regarding public service corporations were the reports of these utilities to the Public Service Commission and to the State Tax Commission. For each class of public service corporation a representative sample was selected from among those corporations for which records were complete for the ten year period 1911-1920. The ratios were worked out on the basis of ten-year averages for this sample group.

Preceding the general discussion of tax burden in the report of the committee are figures showing the number of corporations included in the samples on which the ratios are based, and the number and percentage in each class operating at an average profit over the whole period covered. The figures presented for the four chief utility groups are given in Table I.

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[1] In order to determine what the expenses of complying with the present tax laws amounted to, the committee circularized all the public service corporations in the State. For 330 corporations replying, the expenses involved in paying taxes and contesting assessments amounted to $366,785 annually. (This does not include, of course, the amounts paid in taxes.) Of this total $175,381, or 48 per cent, had to do with the special franchise tax.

Telephone and telegraph companies show the highest percentage operating at a profit, while electric railways show the lowest percentage.

RELATION OF TAXES TO NET INCOME WITH DIFFERENT UTILITIES

In measuring tax burden, the committee first sets up a comparison between the individual corporations within each of the given groups. When total taxes, state and local, are expressed as a percentage of net income, the ratios for individual electric railways vary from 15 per cent to 625 per cent. That is, there is one company for which total taxes amount to 15 per cent of net income and there is another company, at the other extreme, for which taxes amount to 625 per cent of net income.[2] The other companies lie between these two limits. The figures demonstrate beyond question that the present system of taxing electric railways results in marked inequalities of burden within this group. The actual distribution is shown in Table II.

TABLE II—RELATION OF TOTAL STATE AND LOCAL TAXES TO NET INCOME, ELECTRIC RAILWAYS IN NEW YORK STATE

Based upon the average annual tax payments and the average annual net income during the period of 1911–1920.

Class[3]	Number in Class	Number Showing Deficit	Percentage of net income paid in taxes—Number Paying: Less Than 50 per Cent	50 per Cent to 99 per Cent	100 per Cent to 149 per Cent	200 per Cent to 249 per Cent	250 per Cent to 299 per Cent	600 per Cent to 649 per Cent
A	10	3	4	2	1	..	..	..
B	27	8	10	4	1	..	3	1
C	19	11	4	1	2	1	..	..
Total	56	22	18	7	4	1	3	1

Of the eighteen corporations paying less than 50 per cent of their net income in taxes two pay from 15 to 20 per cent, one from 20 to 25 per cent, two from 25 to 30 per cent, four from 30 to 35 per cent, five from 35 to 40 per cent and four from 45 to 50 per cent.

Within the electric railway group wide variations in tax burden are found. When an average ratio of taxes to net income is worked out for the electric railway group as a whole and compared with similar ratios for the other utility groups significant inequalities are also found. These ratios are shown in the following table:

TABLE III—RATIO OF AGGREGATE STATE AND LOCAL TAXES TO AGGREGATE NET INCOME, PUBLIC SERVICE CORPORATIONS IN NEW YORK STATE, 1911–1920

Class of Utility	Number of Corporations Included	Ratio of Taxes to Net Income (Expressed as a Percentage Relation)
Steam railroads[4].........	109	28.2
Electric railways.........	56	56.5
Telephone and telegraph..	66	16.2
Gas and electric.........	108	24.1

This table shows that, for the fifty-six electric railways included in the sample, total taxes to the State of New York and to the localities within the state amounted to 56.5 per cent of net income[5] over the ten-year period 1911-1920. This ratio is exactly twice as large as that for steam railroads, the group closest to the electric railway group. For gas and electric companies taxes constitute 24.1 per cent of net income and for telephone and telegraph companies 16.2 per cent.

When companies showing deficits are excluded and ratios worked out for the profitable companies only, the results given in Table IV are secured.

TABLE IV—RATIO OF AGGREGATE STATE AND LOCAL TAXES TO AGGREGATE NET INCOME, PUBLIC SERVICE CORPORATIONS OPERATING AT A PROFIT

Class of Utility	Number of Corporations Included	Ratio of Taxes to Net Income (Expressed as a Percentage Relation)
Steam railroads.........	87	27.3
Electric railways.........	34	44.4
Telephone and telegraph..	62	16.2
Gas and electric.........	97	23.0

The electric railway ratio is reduced to 44.4 per cent, but the general relations between groups remain the same. The burden on the electric railways, measured by the standard of net income, is shown to be distinctly heavier than on any of the other utility groups.

Inasmuch as state and local taxes are assessed and collected by different agencies and are levied on different bases the committee desired to determine the relative burden of taxes paid directly to the state, excluding the local property taxes. Table V contains the ratios given in the report, based upon returns from profitable companies only.

TABLE V—RATIO OF AGGREGATE STATE TAXES TO AGGREGATE NET INCOME, PUBLIC SERVICE CORPORATIONS OPERATING AT A PROFIT

Class of Utility	Number of Corporations Included	Ratio of State Taxes to Net Income (Expressed as a Percentage Relation)
Steam railroads.........	87	2.65
Electric railways.........	34	6.35
Telephone and telegraph..	62	4.10
Gas and electric.........	97	2.80

Although the ratios are smaller, differences no less pronounced appear when this comparison is made. For electric railways taxes paid to the State constitute 6.35 per cent of net income. Telephone and telegraph companies show a ratio of 4.1 per cent, while for gas and electric and steam railroad corporations the ratios are materially lower.

COMPARISON WITH BUSINESS AND FINANCIAL INSTITUTIONS

It is apparent that, as between the different utility groups, the burden of present taxes falls most unequally upon the different corporations affected. Results equally significant are secured when the taxes paid by public service corporations are compared with those paid by business corporations and financial institutions. It is to be expected, of course, that the ratios would be higher in the case of public utilities, as these corporations have traditionally served as tax collectors for the state. To a certain extent this function has been recognized by the rate-making authorities in establishing rates for public service corporations, and some of these taxes are passed on. Recognizing that such differences exist, however, the committee wished to determine what the present burden amounted to for these various corporate groups.

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[2] Net income before taxes have been deducted is the basis of comparison. Thus a ratio of 320 per cent means that a company showed a profit before taxes were paid, but that taxes wiped out this profit and left the company with a deficit. The ratios given, of course, apply only to companies showing a profit before taxes have been paid.

[3] Class A corporations are those with operating revenue $1,000,000 or over. Class B those with operating revenue from $100,000 to $1,000,000. Class C those with operating revenue less than $100,000.

[4] The figure for steam railroads is based upon an eight year average, 1911-1919, excluding 1916, for which adequate tax figures were not available. Returns from forty-nine lessor railroads have been included in establishing the above ratio.

[5] Net income used as a base is, in each case, net income allocated to New York. Main track mileage has served as the allocation basis for steam and electric railroads. Wire mileage and the location of assets have served for telephone and telegraph companies.

As the basis for this comparison the net income tax paid by business corporations was used. This amounts to 4.5 per cent of net income, or, to make the comparison exact, 4.3 per cent of net income before property taxes have been deducted. Corporations paying this tax are relieved of all other taxes except those on real property. For the purpose of comparison all taxes paid to the State by public service corporations, plus taxes on personal property and taxes on intangible elements in special franchise valuations, were taken to correspond to this business corporation tax. For financial institutions the bank stock taxes paid by national and state banks and the franchise taxes paid to the state by savings banks, trust companies and investment companies were accepted as equivalent to the business corporation tax.

In making a comparison of the tax burden borne by these different classes of corporations the committee points out that, because of certain differences in the definition of net income and in the number of years used as base in the study of the different groups, the ratios for the different classes should be used to establish general relations only. This applies particularly to the comparison of financial institutions with public service corporations. The ratios presented in Table VI should be studied with this caution in mind.

TAX RATIOS OF ELECTRIC RAILWAYS HIGHER THAN THOSE OF OTHER CORPORATE CLASSES

With the exception of investment companies and steam railroads all classes of financial institutions and public utilities are seen to be paying more in non-property taxes than business corporations. The ratio for the electric railway group is markedly higher than for any of the other corporate classes.[6]

The inequalities in tax burden revealed by this study have raised questions as to the advisability of fundamental alterations in the present system of taxing corporations in New York State. It has been demonstrated that under the present complex system pronounced inequalities have developed, both within each corporate group and between groups. The committee has developed a constructive program looking toward the elimination of these inequalities and the general simplification of the tax system. The action of the Legislature upon the proposals of the committee will be awaited with interest.

TABLE VI—RELATION OF TAXES TO NET INCOME, BUSINESS CORPORATIONS, FINANCIAL INSTITUTIONS AND PUBLIC SERVICE CORPORATIONS IN NEW YORK STATE

(All taxes other than those paid on real estate property are included)

Class of Corporation	Ratio of Taxes to Net Income, (Expressed as a Percentage Relation)
Mercantile and manufacturing	4.30
National banks	6.80
State banks	6.58
Trust companies	7.33
Investment companies	3.13
Savings banks	5.80
Steam railroads	3.88
Electric railways	15.60
Telephone and telegraph	7.20
Gas and electric	7.40

Letters to the Editors

Standardizing the One-Man Car

BROOKLYN, N. Y., Jan. 30, 1922.

To the Editors:

Although averse to a controversy over the merits of several types of one-man cars as related to the broad subject of standardization, I believe, after reading the letters of Messrs. Clark and Palmer, in the ELECTRIC RAILWAY JOURNAL for Jan. 28, that it would be inadvisable for the writer to drop the matter without a more emphatic and direct indication as to where these gentlemen, as well as many others, err.

It is difficult to reconcile the thought conveyed in the very able and complete editorial headed "Standardization Is Essential to Prosperity," published in the Jan. 7 issue of the ELECTRIC RAILWAY JOURNAL, with Mr. Palmer's comments regarding the problem of the Transportation & Traffic Association, in so far as they apply to one-man cars.

Mr. Clark has by no means grasped my viewpoint, as I have not said that the Birney one-man car is the last word in standardization. I believe that there never will be a last word in any form of standardization. Unfortunately, however, in the electric railway industry, standardization, as generally understood, seems to have been applied specifically to detailed parts rather than to complete units. This is not desirable because in any problem it is most essential that the general principles should be defined and clearly understood before an attempt is made to determine underlying details. If this principle was followed as regards electric railway rolling stock, it would decrease the large variety of cars now in service, many of them having originated through the whim and caprice of local railway employees in charge of the maintenance and operation of rolling stock.

The results are that after more than a quarter of a century of operation we find ourselves still confronted with a wide divergence of opinion and absolute lack of uniformity in car design. This condition does not refer particularly to Baltimore or Chicago, as they are little different from many other communities. I have referred to these specific examples only because of their prominence as examples in departing from the

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[6] It should be noted that the high ratio for electric railways is due in part to the character of the standard adopted. Although the committee adopted net income as the best available standard by which to measure tax burden, certain defects in that standard are pointed out. A part of the report is devoted to an examination of the relation between taxes, net income and gross income, the latter being the sum of operating revenues, less expenses, and non-operating income. Gross income deductions (interest and rentals) amounted to 74.3 per cent of gross income for electric railways, 57.1 per cent for steam railroads, 38.9 per cent for gas and electric corporations and 22.6 per cent for telephone and telegraph corporations. These figures indicate that electric railways raise relatively more of their capital by borrowing than do the other utility groups. If all capital were raised by borrowing net income would disappear, and the ratio of taxes to net income would be infinitely large. The greater relative importance of this method of raising capital in the case of the electric railways serves to increase the ratio of taxes to net income.

The committee has worked out certain ratios based upon the relation of tax accruals to net and gross income, in order to determine the effect of these deductions from gross income upon the tax ratio. The tax accruals in this case relate to all taxes, not to New York taxes alone; no allocation to New York has been made in the net income figure used.

Class of Utility	Ratio of Tax Accruals to Net Income	Ratio of Tax Accruals to Gross Income
Steam railroads	22.71	11.13
Electric railways	37.71	13.46
Telephone and telegraph	9.09	7.17
Gas and electric	19.10	12.58

It is apparent that when the ratio of tax accruals to gross income is determined the wider discrepancies found on the net income basis are ironed out, though they do not entirely disappear. The electric railway ratio is greater in each case than the ratios for the other groups.

nearest approach to a standard car for city and suburban service than has been developed so far.

The best answer to Mr. Palmer's criticism of the applicability of the Birney car to general operating conditions is the fact that it is used throughout the United States in hundreds of communities with a population ranging from a few thousand inhabitants up to nearly 7,000,000, and that there are approximately 8,000 safety cars in service today. Furthermore, their operation has undoubtedly opened up the very broad field of one-man car operation, so that it seems probable that within the next ten to fifteen years, and no doubt much sooner, at least 80 per cent of the entire electric railway rolling stock will be handled upon the one-man principle.

Last year the writer, with one other railway employee, had the pleasure of co-operating with a manufacturers' committee whose purpose was to further the standardization of one-man cars. Considerable progress was made in spite of the many and diversified interests involved. Manufacturers must be ready to build any type of vehicle that the customer specifies, but it is hard to understand why specific designs of cars on the part of the railway company can be justified, except perhaps within communities where it is necessary to satisfy influences outside rather than within the corporation itself.

Mr. Clark's statement that the selection of the proper type of car should be decided from the operating standpoint by the operating man is indeed a fallacy. As car equipment is constantly in evidence before the public, purchases should be made with due regard to local public opinion, but careful consideration should also be given to avoiding unnecessary additions to the capital account, which mean much to the owners of the property.

WILLIAM G. GOVE,
Past-President American Electric Railway
Engineering Association.

Douglas Fir as Tie Timber

WEST COAST FOREST PRODUCTS BUREAU

SEATTLE, WASH., Jan. 25, 1922.

To the Editors:

I regretted to see in the editorial "A Long Way to Go for Ties" in your Dec. 17 issue that you referred to the Doublas fir tie as "an inferior tie rated low in the scale of mechanical property ratings of lumber."

All softwoods are "inferior" to oak, for instance, in mechanical resistance, and hardwoods and all other softwoods, untreated, are "inferior" to cedar, redwood and cypress in durability, although these woods do not rank high in mechanical resistance. For fear, however, that some of your readers may understand the term "inferior" to refer to Douglas fir in the scale of softwood species, I would like to call your attention to a few facts in regard to Douglas fir.

One-fourth of all the standing timber in the United States is Douglas fir and it is rapidly coming to be a wood of prime importance in the East as well as in the West. It grows in mountainous country and this means that it grows at altitudes varying from sea level to 4,000 and 5,000 ft., under varying conditions of soil and rainfall and with varying exposure to the north and south and east and west on various slopes of the main ranges and their lateral spurs. As a consequence, there is a variation in type from rapid growth light-weight wood to close-grained dense material. Tables of species values, often unfortunately for Douglas fir, are based on the average of all types of Douglas fir, and their comparison with hardwoods and even with other softwoods does not give an accurate reflection of values which would apply to the types of Douglas fir which should be selected for various uses.

The Forest Service recognizes the above fact and in its correspondence gives proper comparisons and has now under way the preparation of matter which will put this information in proper published form.

Then again, referring directly to ties, Eastern railroads have for years used the highest type of wood structure for tie purposes and have considered white oak and chestnut as such. Western roads, on the contrary, perhaps because of the length of their lines through undeveloped territory and the necessity of seeking lowest first cost, have used the poorest section of the log, and the Western lumber manufacturer has considered the railroad tie as the outlet for material which could not go into any other grade.

As a consequence, data on Eastern and Western tie experience have been based on these uncomparable types, and the first Douglas fir ties which went into Eastern territory were of this character and undoubtedly gave an erroneous impression of the Douglas fir tie in many quarters.

Douglas fir is most comparable to and is classed by the Forest Service with the Southern pines, and Douglas fir of the rate of growth and density of longleaf pine has comparable strength in practically all properties with the type of Southern pine that is commercially known under this species name.

C. J. HOGUE, Manager.

EDITORS' NOTE: In his comment on the editorial printed in the Dec. 17 issue, Mr. Hogue brings out some valuable information regarding Douglas fir. This editorial was not designed to disparage the use of Douglas fir. It stated that 8 per cent of the ties used in the United States are made of this species of wood. It may be classed next to the oak, chestnut and longleaf yellow pine, especially in view of its seven years' estimated untreated life. The term "inferior" as it was used in the editorial was intended in the broad technical sense in which railroad men are prone to class all ties which are inferior in any way to white oak, longleaf yellow pine or chestnut as "inferior ties." Hence as used in the editorial "inferior" means simply "lower in rating."

The editorial reference to mechanical rating of timber was taken from the "Cross Tie Bulletin" for Feb. 15, 1921, page 6. The "scale of hardness" table referred to was from Bulletin 556 of the United States Department of Agriculture. This scale may be taken to indicate relative resistance to rail wear and need for mechanical protection.

It may be taken for granted that hardwood makes the best ties, particularly white oak, bur oak and chestnut. These are considered as the standard in railroad terms and any softwood is considered "inferior" for tie purposes. In the C., B. & Q. R.R. classification of tie timber for use with or without preservatives, the Douglas fir is classed as No. 4 in the softwood, treated class, being thus "inferior" to cedar or cypress, which do not call for treatment. This matter was discussed in the issue of this paper for Feb. 15, 1919, page 311, Table II. In the hardness scale white oak stands 1060 and Douglas fir 470. There are twelve species of wood of harder grades between the two.

Great Interest at C.E.R.A. Annual Meeting

Considerable Information on Light-Weight Interurban Cars, Wheel Welding, Current Collectors, Track Maintenance, Pick-up and Delivery Freight Service and Publicity Brought Out in Papers and Discussion—Boat Trip Approved—S. W. Greenland Elected President

TWO hundred and fifty strong, railway men and supply men attended the annual convention of the Central Electric Railway Association at Indianapolis, Jan. 26 and 27. The meetings were notable for the great interest displayed in the subjects covered by the instructive program, the general harmony, good spirit and good time that prevailed under the able direction of President A. C. Blinn, Akron, Ohio.

Of the business transacted, the election of Samuel W. Greenland, Fort Wayne, Ind., as the new president is of outstanding importance. And perhaps next in order of popularity, if not serious import, was the almost unanimous approval by the convention of another boat trip for the summer meeting, as expressed in adopting a resolution recommending the boat trip to the executive committee. President Greenland appointed as members of the hotel and arrangements committee "Judge" S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, chairman; "Commodore" John Benham, International Register Company, Chicago, secretary; Harry L. Brown, ELECTRIC RAILWAY JOURNAL, Chicago; C. Dorticos, General Electric Company, Chicago, and James H. Drew, Drew Electric & Manufacturing Company, Cleveland, Ohio. They were instructed to report to the executive committee as to the cost and plan of the trip, and the executive committee will then determine whether the boat trip is "on" or "off" for 1922. But it may be said that the boat trip is practically assured.

Reporting to the executive committee on last year's boat trip, the hotel and arrangements committee showed total receipts of $16,256. The settlement with the boat company required $15,321.15 and miscellaneous expenses amounted to $583.51. Refunds for tickets sold but unused amounted to $461, leaving a deficit of $109.66.

The executive committee discussed the advisability of increasing the number of meetings from two to three a year, the convention having approved the opposite change last year, but the committee decided against such an increase now. Plans for next year were also discussed and several new memberships approved. Abstracts from the report of Secretary L. E. Earlywine appear on page 193.

A feature of the program was the banquet on Thursday evening, at which all serious thought was abandoned and the guests were most enjoyably entertained by W. L. Wilkie, attorney for the Northern Ohio Traction & Light Company, Akron, Ohio, and Thomas Hendricks, Cleveland. Mr. Wilkie's one serious thought was to urge more effort toward popularizing the electric railways. Mr. Hendrick's message, sprinkled in with a most humorous relation of the famous story of David and Goliath, in terms of 1922 language and interpretation, was to urge faith in one's self and one's work, the spirit of sacrifice that generates loyalty, and love of one's job for the job's sake. For by radiating these attributes, he said, we can do more than kings and potentates for the bettering of ourselves and our industry.

SAMUEL W. GREENLAND

The first session, Thursday morning, was given over to the address of the president, the business transactions and a paper on light-weight cars for interurban service. In the afternoon the Engineering Council had charge of the meeting and G. T. Seely, Youngstown, Ohio, as chairman of the council, presided. Papers on welding steel wheels, trolley contact devices and reclaiming tracks were read and discussed. Friday morning there was a paper by Mr. Ackerman on joint freight service by an interurban line and a trucking company and an address by Labert St. Clair on how to win public approval. The address of the president and these several papers appear elsewhere in this issue. The last business transacted before adjournment was the election of officers.

The nominating committee, which is composed of Charles L. Henry, L. G. Parker, G. K. Jefferies, W. S. Rodger and G. T. Seely, reported its choice at this time as follows, the convention making the elections by unanimous ballot: President, Samuel W. Greenland, vice-president and general manager Indiana Service Corporation, Fort Wayne, Ind.; first vice-president, James P. Barnes, president Louisville (Ky.) Railway; second vice-president, Harry Reid, president Interstate Public Service Company, Indianapolis, Ind. The following members of the executive committee were also elected: Robert I. Todd, A. C. Blinn, H. A. Nicholl, C. N. Wilcoxon, W. S. Rodger, F. W. Coen, J. F. Collins, M. B. Lambert, F. N. Root, G. T. Seely and W. K. Morley.

Considerable interest was expressed following the reading of Mr. See's paper on "Light-Weight Interurban Cars," that it has been possible to develop a light car satisfactory for interurban service. Although there was much misunderstanding evident in the discussion as to the distinction between cars for suburban service and those for interurban service, all concurred that there is an opportunity for lightening interurban cars generally. It was brought out that there are very few possibilities of carrying the standardization to any such degree as has been done with the safety car; on the contrary, it was realized that rolling stock for interurban operation must be designed with more attention to the conditions on each individual property. Some of those operating high-speed interurbans could not be convinced that cars as light as those described by Mr. See could satisfactorily comply with their conditions of speed and safety. However, they were ready to reduce car weights wherever possible and to conform to the best modern engineering practice.

Several instances were cited where light-weight cars are giving good or better service than heavier cars which they replace and at but a fraction of the cost. Excellent results have been obtained on the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, where 26,000-lb., 44-ft. interurbans equipped with four 45-hp. motors are being operated. After being operated 3,500,000 miles during the four years that they have been in use, the equipment is still in good condition. Their maintenance cost has been but

1¾ cents per car-mile over this four-year period and there have been no armature repairs during the last three and one-half years. These cars use but 1 kw.-hr. per car-mile. Another company was reported to be operating some 14-ton cars which are otherwise the same, but have a maintenance cost of but 1¼ to 1½ cents per car-mile. The Kentucky Traction and Terminal Company, is replacing its old interurban equipment, which is still in good condition, with 12-ton forty-four passenger cars equipped with four 25-hp. motors. These cars will make a schedule speed of 22 m.p.h. and the present headway of one and one-half hours will probably be cut to one hour and possible to three-quarters of an hour on account of bus competition. The cost of this equipment was between $10,500 to $11,000.

DISCUSSION OF WELDING WHEELS

A discussion of the economics of building up flanges by electric welding versus only turning them, by R. C. Taylor, superintendent of equipment Michigan Railway, Albion, Mich., was presented in his absence by Mr. Earlywine. Mr. Taylor based his comparison on the cost per unit of wheel diameter for the purchase price plus the additional maintenance expense on the wheel during its life. On this basis he showed that for a 37-in. wheel the cost was 68 cents per unit for the welded wheel as against only 52 cents for the turned wheel. Similarly, for a 36-in. wheel, he showed the comparative figures to be 80 cents for the welded wheel and 64 cents for the turned wheel. He maintained that it was entirely meaningless to compare wheel costs on the basis of car mileage or wheel mileage. He noted that the mileage ratio obtained from the welded wheel as compared to the non-welded wheel in Mr. Sigler's paper was 1.16 to 1 and in Mr. Gunn's paper was 1.4 to 1. He said, however, that as the mileage or work cost is higher for the welded wheel, this advantage in mileage ratio may be of doubtful value.

Mr. Taylor also said that in endeavoring to reduce the cost of wheels per unit of work performed, the mechanical men have plenty of room for experimenting and discussion. He recalled what a great improvement has been made in the steel wheel since its introduction. Further improvement in rolled steel wheels may be expected when the roads insist on wheels made of better steel and its alloys, and treated and hardened to increase the work that can be obtained. Experiments are now being made along this line. The work of our present steel wheel may be considerably raised if we give the same attention to lubricating the flanges that we now do to the bearings. This should be done and doubtless will be in the near future.

P. V. C. See, Akron, Ohio, expressed some skepticism in regard to the effect of the welding on the structure of the steel, fearing that it might cause some strain in the metal of a dangerous character, and for this reason he said he had tried welding on wheels used on safety cars, but had not dared to do it for high-speed interurban wheels. A very pertinent point made was that four steel wheels in use by the Northern Ohio Traction & Light Company have recently broken, the most recent case having caused a very serious accident. Had this wheel been one on which welding had been done the company would have been seriously pressed to prove that the breakage was not due to the welding, or that the company had exerted the utmost care to preserve safety.

G. H. Kelsay, Elyria, Ohio, concurred in the expressions of Mr. See. On the other hand, E. B. Gunn called attention to the fact that, according to his method, there remained ⅜ in. of stock of the old wheel in the flange on which the new metal is built up, which gives a good factor of safety. If the welding is properly done and is not spoiled by an effort to do it too quickly, he thought that there is no danger of strain in the metal. He emphasized that good, careful welding work in this connection is absolutely necessary.

Another equipment engineer brought out the fact that on his system, with an average of 365,000 car-miles per month, he had never had a wheel break with the 37-in. steel wheels used. He thought that the need for welding flanges could be largely overcome by careful inspection. His comment was that sharp flanges are the result either of soft flanges or of out-of-square trucks. If the metal is soft it ought not to be welded. If the tendency toward wearing sharp is due to the truck being slightly out of square, this can be corrected by some work on the truck or by reversing the pair of wheels. He also felt that if the wheels were turned a little earlier, as the flanges wore thin, instead of waiting until the limit of safety had been reached, it would not be necessary to turn away so much of the tread and the aggregate mileage during the life of the wheel would be increased and would largely offset the advantage that might be secured from welding. He has secured an average life on the wheels mentioned of 168,000 miles.

Terence Scullin, Cleveland, Ohio, was inclined to depreciate the cost figures given in the papers. He reiterated the thought made in Mr. Taylor's discussion that he believed heat-treated steel wheels could be produced at a small additional expense and that the mileage could thereby be doubled. He thought that there was no good reason why the same excellent results cannot be obtained from treated steel wheels that have been derived from the use of treated steel gears.

One of the delegates present brought out the fact that the Erie Railroad is welding passenger locomotive flanges extensively and sending them out rough without any machining. This is also the practice followed by M. M. Nash, Terre Haute, Ind., on the interurban cars of the Terre Haute division, Terre Haute, Indianapolis & Eastern Traction Company. In this welding work Mr. Nash does not have the wheels removed from the truck, the truck merely being rolled out from under the car for convenience in working. He has one pair of wheels that have gone 266,000 miles and as far as he could see, he said, they were good for that much more. The method of wheel welding followed by Mr. Nash was described in ELECTRIC RAILWAY JOURNAL for May 7, 1921, Volume 57, page 860.

A representative of one of the wheel manufacturers expressed the view that the welding of flanges was an unsafe practice because the sudden cooling which follows the fusion of the metals, due to abstraction of the heat by the surrounding steel, is almost the same as quenching, and therefore is very likely to set up unusual strains in the metal of the flange.

Chairman Seely summed up the discussion by saying that while there is much doubt on the part of many equipment engineers, it is nevertheless true that the practice of welding is being followed to the satisfaction of the officials of certain companies, and he thought they would not permit this to be done if they were not reasonably certain that it was safe. He commended the men who had the nerve to try out the practice.

DISCUSSION ON CURRENT COLLECTORS

J. F. Elward, master mechanic Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, in discussing the papers on the relative merits of the trolley shoe and the trolley wheel, said he had at one time had seventy-five shoes in use in city service and that they had been very satisfactory except for the inability to back up. Recently the Danville division of the T. H., I. & E. has been equipped with a new type of shoe made by the Automatic Sliding Trolley Company, Frankfort, Ind., having a wheel at the rear end of the shoe which comes in contact with the wire when the car backs up. Mr. Elward said that the operation of this shoe was good, but the maintenance high. He said that with the shoe, costing him $7.50, he had obtained 8,778 miles, or a cost per 1,000 miles of 85 cents. By way of comparison, he said that a trolley wheel costing $1.39 gave 4,064 miles, or a cost of 34 cents per 1,000 miles. He made the comment that if as much attention were given to perfecting trolley wheels as is being given to sliding contacts there would be much less trouble than there is with the wheels.

In regard to the building up of copper in the groove of trolley wheels, he said that an investigation to explain the cause of this had been made and it had developed that the trolley stand was worn, the harp loose and the pin worn, causing high resistance in the circuit. By putting a jumper around these parts, the trouble was eliminated.

Another master mechanic said he

had never had a trolley wheel build up. He had tried seven different kinds of trolley shoes and said that if it were not for the difficulty in backing up the Miller shoe would be a great success on high-speed lines where the current collected is large. He said that in order to average 3,000 miles on a trolley wheel, it is necessary to have the best wheel made and everything about the collecting mechanism just right.

W. McKay White, Goshen, Ind., pointed out that experience had shown that the sliding contact does not work as well on No. 00 wire, such as is used on some city systems, as it does on No. 000 and No. 0000 wire. In reply to a question about the use of shoes on city lines, he said that the shoe is being used with success by the Oakwood Street Railway, Dayton, Ohio, and by the city lines in Los Angeles, Cal. The use of the shoe on grooved wire somewhat approximates the pantagraph which is considered the best current collector. He said that one equipment man had found that if he tightened up the harp so that the wheel rolled hard, copper would be built up on the wheel; and then if the harp was loosened, the wheel would wear out. The large current collecting capacity of the shoe is its main virtue. He also pointed out that the trolley shoe has been far more successful on steel wire than the wheel.

Professor D. D. Ewing, Purdue University, presented some of the results of a study of the electrical and mechanical losses in current collecting devices which threw much light on the subject. The results of this study were given in an article which appeared in ELECTRIC RAILWAY JOURNAL for Oct. 23, 1920, volume 56, page 866. Professor Ewing also presented the results of further investigation on this subject, which appears elsewhere in this issue.

DISCUSSION ON PICK-UP AND DELIVERY SERVICE

In the discussion which followed the paper by Mr. Ackerman on pick-up and delivery service, it was brought out that the railway company, in conjunction with a trucking company in Cincinnati, maintains three rates: A straight class rate for the railway service only, a pick-up and delivery rate which includes both railway and trucking service, and a pick-up or delivery rate which covers the railway service and trucking at one end of the rail haul only. The pick-up and delivery service has added approximately 100 per cent to the standard railway rate. This makes a total rate practically equivalent to that for express. Any claims occurring, if the responsibility is concealed, are distributed 50 per cent to the railway and 50 per cent to the trucking company. If the responsibility can be fixed on either the railway or the trucking company the one involved pays the total claim. Mr. Ackerman said, however, that the claims involved have been reduced as compared to the former claims of the railway before the joint arrangement with the trucking company was entered into. Practically any class of freight will be handled, the only restriction being on live stock. In providing the pick-up or delivery service in the smaller cities reached by the traction lines, the cost is paid out of the railway revenue. This has been found necessary in order to meet the competition. The company in Cincinnati with which the traction company has this joint arrangement has a fleet of sixty-four trucks and it has been transformed from a competitor of the traction line in freight hauling to an ally.

Expresses Confidence in Future of Traction*

President Blinn in Address Before C.E.R.A. Speaks of Rates, Urges Financing by Customer Stock Sale and Points Out Feasibility of Using Motor Buses

BY A. C. BLINN
Vice-President and General Manager
Northern Ohio Traction & Light Company, Akron, Ohio

IN SELECTING Indianapolis for this meeting, the Central Electric Railway Association was prompted by a genuine desire to honor our distinguished co-worker who heads the American Electric Railway Association—Robert I. Todd. This is his home and from here he has performed gallant service to this great industry which we represent. Mr. Todd has long been a valued member of our organization. He was its president in 1920, and this association feels that it has been signally honored by his selection as president of the American Association where he will have the fullest opportunity to perform a great work for which he is so ably qualified.

I desire, upon this occasion, also, to publicly express my thanks for the cooperation and help of the executive committee and my fellow officers. To me they have given full measure of assistance.

During the year 1921 your association held one meeting in the latter part of June on the steamship South American, which was largely attended by the members, their families and friends. That meeting was a success in every particular, and the thanks of the association are due the hotel and arrangement committee, whose untiring efforts resulted in one of the most enjoyable summer meetings this association has ever held. Our members have little conception of the vast amount of work involved in arranging for that boat trip, and too much cannot be said in praise of those who had the matter in charge.

A careful review of the operating results obtained during the year just passed, brings to the mind of the busy operator few thoughts that are refreshing. In 1920 the electric railways entered the period of business depression in a miserable, half-starved condition, brought about, let us say, by a lack of understanding on the part of rate-regulating bodies concerning our real problems and the numerous difficulties with which our properties have been confronted for many years. The manner in which the managements are bringing the companies through this trying period insures for them the profound admiration of every business man in this country.

Rates have not been, and are not now, in any sense commensurate with the cost of conducting the business in a manner demanded by the public. In many cases, particularly where the control has rested with municipal authorities, rates have been changed simply as a matter of political expediency, little regard, if any, being given to the necessities of the situation.

During the period of the war operating costs were higher than had ever been experienced in our history, and when all other business was enjoying profits far beyond its fondest dreams, our railways were, in most instances, kept by rate-regulating bodies in a condition where they were compelled to serve the public at rates which were by no means adequate to meet all of the costs. The great outstanding feature of those times is the fact that the public was not required to pay proper rates at a time when it was well able to do so.

However, notwithstanding the great difficulties with which we have been confronted, the companies we represent are coming through this depression in a manner that must eventually gain for them the highest commendation on the part of the business world and of the public generally.

We are engaged in operating properties that are performing a great public service—a service that has become an absolute necessity to millions of people, a service that is a material factor in the successful growth of the territories in which our lines are located. Our properties have two important functions:

First, they must, in order to be successful, render service from day to day of the very highest character; second, and equally as important, their facilities must be extended from time to time as the public necessity requires.

If the utility is unable to grow with the community, the community must suffer because it cannot expand without transportation service. To perform either one, or both of these important duties, our corporations must have an income that will pay all operating costs, taxes and depreciation plus a reasonable return on the investment, with sufficient balance to create a surplus to meet unusual hazards—a sufficient balance to be called upon in times of great stress, a balance to tide the properties over in lean years.

Much has been said in the past with

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*President's address to the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

respect to educating the public to the necessity of higher rates. Much has been accomplished along this line, and at this critical period in our lives we must approach the future with renewed efforts towards building good will and educating the people generally on the question of income and outgo. Under present revenues the electric railways cannot properly serve the public year after year as the public is entitled to be served. Our service cannot be of the high type which is demanded, nor can the facilities be extended, unless the rate situation is materially improved.

The public must understand that these properties require large capital expenditures each year, and that capital cannot be forced into this or any business; it must come voluntarily from the investor and it will not come unless it is assured of a safe and regular return.

We must pay labor its wage, likewise we must pay the wage of capital. Like labor, if capital cannot earn it will not work. If this business is denied proper rates it cannot earn. The rate-regulating authorities in this country in numerous cases have recognized these fundamentals and have granted some measure of relief. On the other hand, there are many instances where such relief has been denied.

Where rates are fixed by politicians for political purposes there is but one relief and that is from the public itself. No effort should be spared to lay all the facts before the people. We should let no opportunity pass to drive home the argument that this business does not differ from any other business in that it cannot render good service from day to day without an income that will pay all the costs of operation, build a surplus, pay a reasonable return on the investment, and

Further, that our companies cannot bring the much needed new capital into the undertaking, extend their facilities from time to time, unless proper rates prevail.

Stock Sales to Customers Urged

Because of the difficulty in obtaining new money in the manner customary to this business, many public service corporations have undertaken to sell their securities in the communities where they operate. These efforts in many cases have met with wonderful success, and a most ideal condition is to have a large number of stockholders in the territory we serve.

I venture the assertion that the acquisition of an interest in the properties we represent by the customers of these properties will have a sobering influence upon radicalism. In my judgment where the savings of local citizens (customers) are invested in their utility the chances of fair treatment are multiplied and the likelihood of serious disputes reduced. It will be interesting to watch he course of proposed radical legislaion in communities where the customer-ownership idea has gained considerable headway. If I look into the future aright, participation in our business through investment in our securities bodes ill to the demagogue whose success in the past has so often been based upon appeals to ignorance and indifference in districts holding false notions, or no ideas at all, about local utilities.

But securities cannot be sold in our several localities unless the purchaser can be assured beyond the question of all doubt that his dividends are going to be paid with regularity. He looks for that assurance when making an investment in business other than ours, and he has the right to expect it if he invests with us. Therefore, one of the great problems is to obtain an income that is fair to the stockholders, and fair to the users of the service.

Create a Feeling of Confidence

We must use every endeavor to create in the minds of our people a feeling of faith and confidence in our institutions. One great difficulty that has existed throughout this nation in the past is that the plant of "confidence" has not been nourished and has not grown as it should. It has suffered severely from the cyclone it has weathered. It is this restoration of confidence which we seek when we foster customer-ownership. If the users of our service have faith in our properties and in us, and we are allowed to earn on the dollars invested in the property, then we can expect our patrons to become partners in our business.

The company which I have the honor to represent has been selling its preferred stock in the territory in which it operates since July, 1921. Up to the present time it has sold approximately 6,000 shares to the users of its service. The money derived from the sale of its stock has been used only for capital expenditures, and this company will continue to do a large part of its financing in this manner because of the many benefits that can be derived thereby. I urgently recommend that the properties here represented thoroughly investigate this method of finance and put it into effect wherever it is possible for them to do so.

In my judgment customer-ownership will establish, beyond doubt, confidence which will have for its just reward the development so sorely needed, to the end that the wheels of progress may once again grind out their daily grist. It is only natural that the people we serve should be our stockholders. Ours is a business they can see every day, one in which they should have confidence and one which will pay them substantial returns on their investment if that investment is properly treated. It is not sufficient merely to offer our securities for sale. They must be offered in small enough denominations, or on the easy-payment plan, so that all can buy. They must be made readily available across a counter, like bread and bacon in a grocery store.

I desire at this time to direct your attention to the development now taking place in bus operation as a means of city and interurban transportation. In my opinion buses will never replace street cars in the large cities of this country. I do believe, however, that we are approaching the time when the growing use of the automobile is going to seriously tax the capacity of our streets and it must follow that urban transportation will be taken care of in a manner calling for the smallest number of units.

The latest type of city motor car and trailer will carry from 175 to 200 persons. To haul the same number with buses would require approximately eight vehicles. It will be seen, therefore, that one street car unit carrying approximately 200 persons during the rush hours, when the capacity of the streets is taxed to the utmost, must survive as against eight motor buses giving the same service. There is a field, however, in which motor transportation can function. I refer to densely populated, outlying districts, not now served by transportation lines which can be found in almost any up-to-date city. These territories can be admirably served for the time being by motor buses, either as extensions to existing railway lines, or buses may be operated advantageously as one line of a railway transportation system. The growing interest on the part of the public in bus transportation calls for a close study of the subject by every railway manager. If the people desire and demand bus transportation, our companies should be the ones to furnish it because we are primarily in the transportation business. The methods are of little consequence.

In conclusion, permit me to look for a moment into the future. Sooner or later business must improve. It is almost impossible to believe that it can become more stagnant and, having weathered the storm so nobly, our properties can look forward with encouragement to the business revival that certainly must come. When the tide will turn no man can tell. We will continue the rigid economies now in effect; we will not be led astray by the cheap optimism that is abroad on every side; we will go on with courage; we will continue to serve; we will do our best, and finally, we will win because we only ask that ordinary justice be given us.

Annual Report of the Secretary and Treasurer

L. E. Earlywine, secretary and treasurer of the association, in presenting his report, referred to the accomplishments of the last twelve months as representing a real advance in the association's activities. He laid particular stress upon the committee work, showing that the new system of executive committee meetings has resulted in better management of the association. He also paid special attention to the organization of the Engineering Council outlined previously in these columns. He quoted one member of the Council as remarking "there are some bouquets, also some bricks, thrown during the meetings, but the purpose of the council is to arrive at the unvarnished truth."

The year 1921 closed with a membership of sixty-four interurban lines, five city lines and three lake steamer lines. The total interurban mileage represented was 5,273.6. This membership represents a decrease of one interurban line and an increase of one city line over the record of the preceding year.

In reporting on the activities of the Central Electric Railway Accountants Association, Mr. Earlywine pointed out that its principal attention had been toward the adoption and use of standard forms, such as astray freight bill, interline way bill, etc.

In reporting on the activities of the Central Electric Railway Traffic Association, he said that it had done a great deal toward the revision of all association joint tariffs, all having been completed with the exception of two during the year. Among the freight tariffs reissued were the equipment records, storage tariff, and exceptions to official classification. Passenger tariffs reissued are tariffs covering movement of special baggage cars, party-fare tariff, 2,000-penny coupon ticket tariff, intrastate passenger tariff in Indiana, joint interstate passenger tariff, as well as the joint local baggage tariff.

Under the auspices of the association, the official interurban map has been revised and new plates made.

He called attention to the particular activities of the committee on prevention of freight claims in its efforts to avoid having steam lines "dump" second-hand containers on the electric lines.

Another committee becoming active is that on motor bus and motor truck competition. This committee, Mr. Earlywine pointed out, is not throwing stones at motor competition, but works on the idea that while the motor bus is here to stay, there is a certain defined place for it and it should be the duty of all transportation officials to see that it is held to its place.

In closing Mr. Earlywine placed emphasis on the attitude of the public which likes to consider electric carriers —interurban lines—as one line in dealing on through transportation questions whether passenger or freight. He recommended that the association continue to work to iron out all difficulties of interline co-operation.

Light Interurban Cars Save $47,000 Annually*

Better, Safer Service Given on N. O. T. & L. Line with 42,000 Lb. Cars—How These Cars Effect a Saving Amounting to Over 19 per Cent on the Investment Is Interestingly Analyzed

By PIERRE V. C. SEE
Superintendent of Equipment Northern Ohio Traction & Light Company, Akron, Ohio

AN UNCLE of mine in the Tennessee Mountains had for his favorite saying the phrase, "It stands to reason," in discussing the economy of converting corn he raised into a compact fluid. He held it to be more economical to invest in a small barrel then in a big corn crib, the maintenance on the barrel being considerably less than on the crib over a period of years, to say nothing of the lesser original investment and the revenue produced.

It "stands to reason" that a compact, light-weight, steel electric street or interurban car is more economical to operate than a heavy wooden or steel car, but the questions in the mind of most electric railway managers are:

Will the light-weight car give the satisfaction for interurban service that the heavy type has given over a period of years? Will the cost of maintenance be less? Will there be a real saving in dollars on the investment, a saving in energy, a saving on the roadway? Will the lighter car meet with public approval for interurban service?

These are questions of vital importance to railway operators, and these are the questions I shall endeavor to answer—not by saying that "it stands to reason" the saving is there, but to submit to you plain figures based upon one year's operation of the light-weight interurban car on the Akron-Kent-Ravenna division of the Northern Ohio Traction & Light Company's interurban system. It may be added that subsequently other cars of this type were placed in service between North Canton, Canton and Massillon.

Electric railway men throughout the world have recognized, during the last few years of rising costs, the necessity for more economical operation if the electric railways were to develop properly to meet the public needs. It was not strictly from the viewpoint of economy, however, that the Northern Ohio Traction & Light Company put into use the lighter type of interurban cars, but rather from a desire to better the service and add to the safety of operation.

In 1919, travel became exceptionally heavy on this division of the system, due to the establishment of new industries and to park travel. The towns reached by the line are Kent and Ravenna, the latter being the eastern terminal, and both having a population exceeding 7,000. A summer resort between the two places, known as Brady Lake, brings a heavy summer traffic. The line runs through the principal street of Cuyahoga Falls, a city of 10,000, joining Akron on the northeast. The territory along the line is closely built up, so that more than half of it is city streets and suburban districts where high-speed running is not permissible. The line is 18.6 miles of single track and it has numerous heavy grades and curves. There is one 12 per cent grade about 2,200 ft. long and many 4 and 5 per cent grades over the rolling profile.

The company in 1919 was operating a wooden type car weighing 62,000 lb equipped with quadruple G.E.-57 motors and K-34D control. The motors had a high-speed gear ratio. The frequent stops and the heavy grades and curves brought high maintenance on the electrical equipment. It was necessary also to operate each car independently running the trains in sections, for the reason that these cars were not equipped with multiple-unit control.

Investigation relative to multiple control led to inquiry concerning a lighter type of car. The advantages of a lighter car, geared for a lower balancing speed, were immediately recognized with the result that lighter center-entrance cars of the Peter Witt type were ordered for the line in the spring of 1920. Delivery was made in October and on Nov. 1, 1920, the old cars were replaced by Peter Witt cars having 26-in. wheels, weighing 41,900 lb. and having a seating capacity of fifty-four passengers. The cars were equipped with quadruple Westinghouse 532-A motors of 50 hp. each and H.L control arranged for multiple-unit train operation. The heavy grades prevent the use of trailers. The motors were geared for a balancing speed of approximately 32 m.p.h. at 600 volts. A detailed comparison between the old and the new cars follows:

	Old Type Car	New Lightweight Peter Witt Car
Weight, pounds	62,000	41,900
Length	45 ft. 3 in.	50 ft. 3 in
Height of floor above rail	50 in.	36 in.
Seating capacity	46	54
Motor equipment	4 G. E. 57	4 W.H.532-A
Motor, horsepower	50 at 500 v.	50 at 600 v
Gear ratio	24 63	16–56
Size of wheel	36 in.	26 in.
Free running speed, at 600 volts	40 m.p.h.	32 m.p.h.
Kilowatt-hours per car-mile at car	3.26	1.80
Kilowatt-hours per car-mile, at d.c. bus	3.95	1.97
Maximum current from trolley	540 amp.	340 amp.

It will be noted that the new cars weigh only two-thirds as much as the old cars, yet are longer and have a greater seating capacity. The light rattan seats do not give quite the comfort of the heavily padded plush seats, but no complaints have been received because of this. The reduction in the wheel diameter from 36-in. to 26-in., taken in conjunction with the correspondingly smaller bolsters and trucks, results in a difference in height of car floors of 14 in. This materially facilitates passenger loading. A further saving in the length of time required for stops is made possible by the center entrance, in that passengers may load and unload at the same time. The control is interlocked with the doors. Door signals only are used in starting trains.

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*Paper presented before Central Electric Railway Association annual convention at Indianapolis, Ind., Jan. 26, 1922.

It may also be noted in this connection that the smoking compartment was abolished. This change not only caused no complaint, but rather a favorable public opinion, the ventilation being greatly improved. The lower steps, and the general step arrangement, decreased step accidents to the minimum. In fact, a step accident has been rare on this line since the change was made. The saving from this safety standpoint can hardly be estimated, but let's see where there have been savings which were easily determined.

ENERGY SAVING PROVES TO BE AN IMPORTANT ITEM

The maximum power demand of the old cars was approximately 325 kw., while that of the lighter cars is only 204 kw., at 600 volts. The peak demand on substations has been reduced accordingly. It will readily be understood that this is due to the weight, gear ratio and the type of motor on the new cars.

The energy consumption of the old cars was 3.95 kw.-hr. per car-mile while that of the new cars is 1.97 kw.-hr. per car-mile, measured at the d.c. substation bus.

MECHANICAL AS WELL AS ELECTRICAL MAINTENANCE REDUCED

So much for the energy consumption. Almost everybody felt that it "stood to reason" the energy consumption would be considerably less. But what of the maintenance? Note this comparison; From Nov. 1, 1920, to Nov. 1, 1921, only one armature was rewound and one repaired on the lighter cars at a total cost of less than $100, while the armature repairs alone on the motors of the old cars from Nov. 1, 1919, to Nov. 1, 1920, was $11,000! This heavy maintenance was due to the extreme grades and high gear ratio of the old cars. Of course, the motors on the old cars were not new motors but every shop man knows that the age of a motor does not materially affect this type of repairs. Here was a saving of $10,900 in twelve months, which amounts to almost a thousand dollars a month.

But that is not all. The lighter trucks and car bodies are more easily repaired, and repairs are made at a lower cost. For example: A gang of three men was required for work on the trucks of the old cars while it has been found that the same class of work on the new cars can be done easily by two men. The old maintenance for 1919-1920 was 5.28 cents per car-mile. This figure corrected for a reduction of 25 per cent made in wages brings 4.62 cents per mile for the old cars under present working conditions. For the new cars with approximately a 35 per cent reduction in weight, the maintenance was 3.21 cents per car-mile, or a saving of 1.41 cents per car-mile. Multiplying this by the Akron-Kent-Ravenna car mileage of 625.539, makes an annual saving on mechanical maintenance of $8,758. To this is added the known saving of $10,900 for armature repairs, giving a total of $19,658 maintenance saving in excess of the energy saving. But even that is not all. The cost of repair parts is considerably lower when it is necessary to purchase repair parts.

Let us go a little farther. The old cars were equipped, as previously noted, with K-34D control and, of course, operated in single car trains. As stated in the beginning, one of the chief reasons for the company deciding to go to the multiple-unit control was to provide increased service and at the same time get away from single-car train operation, and, therefore, make for the safety of the passenger. For in so doing the danger of rear-end collisions (and every operating man realizes the gravity of running trains in sections on a single-track road) was practically eliminated. The new cars with multiple-unit control are operated in two-car trains continuously during the rush hours, and at all times during the summer months to the Brady Lake summer resort. Only three platform men are required on a two-car multiple-unit train instead of the four men required when the old cars ran singly in two sections. This operation effected a saving of 112 man-hours per week during the 17 weeks of the summer and an average of eighty-four man-hours per week during the thirty-five weeks of operation on the winter schedule. As the average rate of pay is 50 cents per hour, the annual reduction in platform expense is $2,422. This two-car train operation also reduces street congestion, which you may readily see also reduces the accident hazard.

VARIOUS ROADWAY SAVINGS HAVE BEEN MADE

And then there is the maintenance of roadway. We have no absolute figures showing actual comparison. It would be unfair to take figures on the cost of maintenance for the last twelve months and compare those figures with the figures of the preceding twelve months, for entering into the savings that have been made are the reductions in material costs, labor and other items. A separate accounting of the material and labor used on this particular division has not been kept, but the maintenance of roadbed has been greatly less during the last year. Assuming that rail cost $6,000 per mile and will last ten years under the operation of the 62,000 lb. car, all conditions being equal, the rail on which the 42,000-lb. car is operated should last proportionately longer. Experiments on the strength of steel have proven that steel will break more easily under much fewer heavy blows than a large number of light blows. Upon this basis, our engineering department has figured the saving in the wear and tear of rail alone at approximately $250 per mile. per year.

Concerning ties, the average maximum life of a good grade of tie is approximately nine years. In other words, a tie will decay during that period to a condition where it is of no value. In the running of heavy cars, the rail will wear itself into the tie, thereby considerably shortening the life of the tie as compared to the life of the tie over which the lighter cars are operated. How much this amounts to is difficult to figure accurately, but it is safe to assert that the ties over which lighter cars are run will last at least one year longer. This being true, the average renewal per year under heavy traffic would be 300 ties per mile. Under the lighter traffic it is but 270 ties per mile, making a net annual saving of 30 ties per mile. At an average price of $1.30 each, this amounts to $39 per mile per year.

THESE CARS ARE THE MONEY-SAVERS

There is also a considerable saving in the reballasting of roadbed. What this amounts to, so far as our experiments go, is but an estimate, but our engineers are a unit in declaring that the saving is easily 10 per cent per year. Track and roadbed, labor and ballasting material costs have been approximately $750 per mile, and upon that basis the 10 per cent saving amounts to $75 per mile. The apparent saving is, therefore, to be summed up as follows: Rail, $250; ties, $39; maintenance of roadbed, $75; total, $364 per mile, or more than $6,700 annually for the roadway of the entire line. Summarized, the savings are as follows:

ANNUAL SAVING OF OPERATING EXPENSES

Energy consumption..	$18,578
Maintenance of car equipment...	19,658
Maintenance of roadway	6,770
Reduction crew expense by train operation....................	2,422
Total annual saving..........	$47,428
Investment	
Purchase price of 15 new cars at $15,109 each................	$226,635
Return on the investment by savings................	19.36 per cent

In addition to these, there were other savings which are difficult to evaluate. With the old cars, pull-ins were frequent and many regular trips were lost with consequent reductions in income. The new cars have been giving excellent service. In view of the competition of a motor bus which parallels the line the entire distance, there can be no question but the irregular service that certainly would have existed through the continuation of the old cars would have diverted much traffic to the bus line.

It became necessary after the cars were in operation a few weeks to lengthen the running time five minutes, but this in no way affected service. It merely reduced the layover at the end of the line. Today we are maintaining, satisfactorily, a thirty-minute headway without a single material complaint.

We have bettered the service by means of the two-car trains; we have eliminated the accident hazard; the cost of energy has been greatly cut down; less men are required for operation; a big saving made in car maintenance; a reduction found in the roadway upkeep; and the Akron-Kent-Ravenna line is really the only line of the system on which the earnings have maintained a straight line across the chasm of business depression that has swept Northern Ohio during the last eighteen months.

Three Years Experience in Welding Worn Flanges*

Results Obtained Have Been Very Satisfactory — Wheel Mileage Has Been Increased Greatly at Small Cost and With No Bad Results From a Safety Standpoint

By E. B. Gunn
Superintendent of Transportation and Equipment
Western Ohio Railway, Wapakoneta, Ohio

OUR practice of building up worn flanges of steel wheels has now been in use for three years. During this period we have repaired flanges on more than 160 pairs of wheels with very satisfactory results except for three wheels referred to in a paper which I presented at the C. E. R. A. summer meeting in 1920. (See ELECTRIC RAILWAY JOURNAL, July 17, 1920, page 129.)

The method used by our company has not been changed since we started, except that we try to do better and neater work. We have been fortunate in keeping the same operator that we had at the start and I feel that a good operator is most necessary for insuring good work, although the welding equipment used must be of a type to insure proper regulation.

We have used the same welding machine for more than three years, and this machine has been in constant service not only in welding wheels but for maintaining the bonding of our 120-mile line, and such other shop work as we have, as well as for doing a good deal of outside welding work. Proper control of the arc is very important in the welding of worn flanges. If the arc is too intense, overheating of the steel in the structure of the wheel might injure it; or if the arc is too short the proper amalgamation is not obtained and shelling results. for the metal in that case is simply laid on the steel structure and is not properly amalgamated.

A good average record is that for a pair of wheels placed on passenger car No. 18 in September, 1918. These wheels were 36 in. diameter, rolled steel and manufactured by the Carnegie Steel Company, Cleveland, Ohio. The car was operated 65,667.9 miles before the wheels were taken out for sharp flanges. These wheels were welded, turned and put back under the car, and made 57,591.3 miles, after which they were again taken out for worn flanges. After again being welded, turned and put back they made 44,025 miles, and apparently these wheels will be good for 15,000 miles more before they are taken out. There is stock enough in the wheels again to weld and turn them, and they should make a total of 242,284 miles. These wheels will be welded and turned and will be installed under a freight trailer, and be used in that service for several years. Before using the welding process our wheel mileage did not average more than 140,000 to 150,000 miles, and then the wheels would have to be scrapped, for they could not be turned for our freight trailer service as they did not have enough stock. The only repairs necessary before they are put into trailer service, is to shape the flange, weld and turn them and pair them up with other worn-out wheels as to size.

The expense of welding the wheels mentioned was, approximately:

50 lb. welding metal at 8 cents per pound.	$12.00
130 hours welding operator labor at 60 cents.	18.00
150 kw.-hr. at 2½ cents	3.75
10 hours machinist labor at 60 cents.......	6 00
	$39.75

This would take care of the extra work involved in welding the wheels and turning the flanges after welding, over the cost of simply turning the wheels if no welding was done. This makes a cost of $4.97 per wheel, or $9.94 per pair. This is not quite 17 cents per 1,000 miles for welding, on the basis of 60,000 miles additional wear.

One of the chief things that the operator must avoid in welding flanges is fast and too steady work as these have a tendency to overheat the metal in the wheel and to cause trouble with the structure of the steel.

So far we have had no broken or cracked flanges on any wheels that we have welded, and we have been using these wheels on all classes of our passenger cars. We also have been doing this work for the Dayton & Troy Electric Railway, the Dayton & Western Traction Company, and the Tiffin, Fostoria & Eastern Traction Company.

I feel that it has gone beyond the experimental stage, and that there is no question of the advisability of doing this work in any shop, either from the standpoint of safety or of economy. We feel that our company has saved more money from the system of welding flanges than from any other one economy introduced within three years.

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*Paper presented before annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

How Flanges Are Welded on Winona Interurban*

By Charles Sigler
Master Mechanic Winona Interurban Railway, Warsaw, Ind.

NO MECHANICAL operation has been passed upon with more varied opinions than the proposition of building up or filling flanges on steel car wheels. In contemplating the work, none have cared to make any sacrifice of safety for economy. There are no text books today which give us any data or recommendations on this subject; neither do the manufacturers of the various welding equipments, nor the manufacturers of welding steels make any guarantee on this particular class of welding, and there are no wheel manufacturers who recommend or approve of flange welding.

About four years ago the writer made his first attempt of applying metal by electric welding to steel wheel flanges. These wheels were used under a low-speed heavy freight motor car. For some time the performance was watched very closely, not from a standpoint of economy, but of safety. As time went on the results were gratifying with regard to both economy and safety. Eliminating details of any of the experiments, none of which ever gave any trouble, but which led up to our present method of filling in flanges on steel wheels, I will try to give a brief explanation as to how the work is done, its cost and the results derived therefrom.

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*Paper presented before annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Most all steel wheels are taken out of service on account of sharp flanges, and in nearly every case there will be one sharp flange on each axle while the other will have become much larger than the original.

In preparing wheels for electric welding or filling, the wheel with the worn flange is turned, taking ¼ in. of metal off the tread and in doing so ¼ in. of new flange at the base. The top of the flange is finished to proper contour, which leaves a right-angle groove in the flange about ⅜ in. deep, and parallel with the tread and ⅛ in. deep at right angles to the tread for a 1 in. flange. The other wheel is turned to the proper diameter and a new flange formed. If both flanges are sharp, the same preparation is made for filling both flanges.

In filling the flange the axle is placed on end, one wheel resting on the floor. This method brings the work to a convenient height for the operator. A ¼-in. welding rod has been found best suited for this work. The welder completes a flange in one hour and forty-five minutes, using 7¼ lb. of welding steel and 120 kw-hr. The total cost per flange is as follows:

Welder's time—1 hour 45 minutes at 50 cents.	$0.88
Steel 7¼ lb. at 25 cents	1.82
Current—120 kw.-hr. at 1½ cents	1.80
Total	$4.50

These figures are based on actual experience, and on this basis I will try to show that filling flanges with electric weld is worth while.

About 55,000 miles is a fair average between turnings on 37-in. steel wheels and during this service the tread wears ¼ in. Then we get about 13,750 miles for each $\frac{1}{16}$ in. of tread wear. In order to make the wheel suitable for service again, using the filled flange, ¼ in. additional metal must be removed from the tread to properly shape the flange for filling. This brings the mileage down to approximately 6,875 miles per $\frac{1}{16}$ in. or 55,000 miles per ½ in. of tread worn and turned off.

Not using the electrically-filled flange, the first results would remain the same, that is: 55,000 miles with ¼ in. of tread wear. In order to form an entirely new flange, it is necessary to remove about ¾ in. of metal from the tread, making a total of 1 in., with a mileage of 3,437 per $\frac{1}{16}$ in. of tread metal worn and turned off.

The mileage per $\frac{1}{16}$ in. of wear, no doubt, will not hold good throughout the life of a wheel. Nevertheless, the ratio of $\frac{1}{16}$ in. of tread wear between wheels with filled flanges and turned flanges will remain the same. Experience has proved that a filled flange will last as long as a turned flange, a fact which makes it possible to double the life of a steel wheel with an additional cost of $15 for filling flanges four times.

Considering past experience, I do not hesitate to recommend both from a standpoint of safety and economy the practice of filling flanges on steel car wheels with an electric welder.

Contact Shoe vs. Trolley Wheel*

The Relative Merits of the Sliding Contact Shoe as Compared with the Standard Trolley Wheel Are Discussed

By H. Savage

Assistant to Master Mechanic (Detroit) United Railway

I DO NOT know of any railway that has tried the sliding contact shoe in city and light suburban service, nor do I think there is any necessity for abandoning trolley wheels for slides of present design. The standard trolley wheel has ample capacity to transmit the current required for equipment in this service, and the speed is not high enough to cause them to leave the wire, but in high-speed and heavy low-speed interurban service it is universally known that the trolley wheel never was satisfactory. While there have been many changes in the design of trolley wheels to meet local conditions, the two principal points of objection to the wheel still remain, that is, lack of contact surface on the wire, and the frequency of the wheel leaving the wire in high-speed service.

I have seen many trolley wheels that have increased in weight from 2 to 4 ounces in approximately 100 miles run. This is caused by copper from the trolley wire being deposited in the groove of the wheel. This, to my mind, is very injurious to the trolley wire and leaves the surface very uneven. This increases the size of the arc between the wheel and wire, which is quite general with heavy high-speed equipment. If steel trolley wire is used the arcing is very pronounced under most favorable conditions.

OBSERVATION ON TWO LINES USING DIFFERENT WHEELS

My observation for a period of about three months of two lines having approximately the same mileage and class of service may be of interest. One line uses the standard trolley wheel, and the other the sliding contact shoe. On the line operating with trolley wheels, the overhead equipment was damaged by the trolley leaving the wire twenty-seven times, and a total of 3,200 ft. of wire was torn down. I am unable to state the damage done to crossarms, span wires and trolley hangers. The following car equipment was used: Trolley poles, fifty-seven; trolley rope, 2,400 ft.; trolley wheels, two hundred and fifty; trolley retrievers, twenty-two. And there was a total delay to service of nineteen and three-quarter hours.

On the line using slides there were seven trolley poles, 280 ft. of trolley rope, three trolley retrievers, and eighty-two sliding contact shoes used. There was no damage to overhead equipment, other than that caused by wear, and no delays to service.

I do not know of any person in possession of information that will show the cost of replacing overhead equipment caused by the wear from sliding contact shoes. From my experience the wear on overhead equipment caused by the use of the sliding contact shoe is slight. An examination of trolley wire where contact shoes had been used continuously for the past twenty-three months showed that the wear on one-way wire is very slight, the wire having a brownish color, slightly glazed, while on wire in two-way operation the wear is more noticeable, but not excessive. The brownish color, and glaze do not appear on this wire.

In comparing the merits of the two devices the sliding contact shoe overcomes all the objectionable points of the trolley wheel. It is also known from numerous tests that the sliding contact shoe has about two and one-half times the life of the standard trolley wheel. If we take into consideration all the damage caused by the trolley wheel as compared with the wear on overhead equipment caused by the sliding contact, I am satisfied that the sliding contact is by far the more economical device to use.

After numerous tests we have found that the forged steel slide has the longest life, and causes the least wear on trolley wire. We also found that on wire where wheels and slides are both used the wear is much more noticeable than if slides or wheels alone were used. This is also true for a short time after trolley wheels are replaced by slides.

It is my opinion that the slides have not reached the point of perfection that they will in the near future. Changes will be brought about which will reduce the initial cost of the slide and also reduce the liability of wear on overhead equipment, which to my mind is greatly exaggerated at the present time.

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*Paper presented before the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Sliding Shoe a Better Collector*

By C. M. Bange

Master Mechanic Interstate Public Service Company, Scottsburg, Ind.

MY PAST experience with the sliding contact shoe has consisted merely of several tests to determine if a saving could be made by its use, which test at that time did not make the showing expected. Since coming to the Interstate Public Service Company, I find the sliding contact shoe filling the place of the trolley wheel where the current carrying capacity is the prime factor required. This the sliding shoe successfully performs while the trolley wheel proves a failure.

When under headway our limited cars draw approximately 400 amp. and from 900 to 1,200 amp. when starting. It was found that under these conditions a standard 6-in. trolley wheel would build up in the groove instead of wearing away. Different tensions from 30 to 35 lb. were tried out but the wheel would collect copper from the line to a depth of about 1/16 in. in 300 to 400 miles. Difficulty in keeping the wheel on the wire was also experienced. The schedule speed is 33 m.p.h. and the running speed at times reaches 60 m.p.h. or better. A wheel running under these conditions very soon becomes out of true and causes the drumming noise with which all are familiar.

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*Abstract of discussion on "Merits of Sliding Contact Shoe" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

The sliding contact shoe overcame all these objections; arcing at the wire is hardly noticeable even on a dark night; speed has very little effect on its sticking to the wire and its operation is not noticeable from the interior of the car. The one real objection is in backing up, for then it is necessary to have some one at the rope, especially when the shoe has worn in grooves.

Whether a lower tension than 25 lb. would still further improve its service I am unable to say, for that is the lowest tension obtainable on the trolley stand in use.

OPPORTUNITY FOR IMPROVEMENT

There are several shoes on the market which manufacturers claim will back up as perfectly as go ahead, but on those I have tested there is still opportunity for great improvement.

From a mechanical and electrical standpoint the sliding contact shoe seems most nearly perfect. When new, most of the shoes that have come under my observation, afford approximately ½ in. of contact with the wire, and after a few hundred miles of operation this is increased to 1 in. and more until worn out. As the shoe does not revolve, it is possible to connect it directly to the harp with a shunt, thereby eliminating all pin and bearing trouble. There are also fewer parts to maintain. And careful inspection of the trolley wire has shown no undue wear from the use of shoes.

The trolley wheel has been developed to a high point of perfection and where the current demand is not excessive, nor the speed too high, it will develop splendid mileage. But care must be observed to insure proper lubrication, and the contact springs must be properly fitted and inspected or the wheel will give out at the hub even before the groove has worn to the scraping stage. When new, only about ⅛ in. bears directly on the wire and this will not materially increase as is the case with the sliding contact shoe. If a wheel is even slightly out of true, or balance, speed enters seriously into its current collecting properties.

The sliding contact shoes used on our cars equipped with four 150-hp. motors have averaged 2,400 miles. With the standard trolley wheel operating on cars equipped with four 75-hp. motors the average has been 2,800 miles, while on those cars equipped with four 50-hp. motors, the shoes have made approximately 3,000 miles.

A Scientific Study of Trolley Wheel and Shoe Losses*

BY D. D. EWING

Professor of Electric Railway Engineering
Purdue University, Lafayette, Ind.

IN ANY comparison of the relative merits of different types of contact devices we must keep clearly in view the practical requirements which a successful contact device must fulfill. In brief these requirements are as follows:

1. It should stay in intimate contact with the trolley wire regardless of the wire position either in a lateral or vertical direction, and regardless of the wire condition, new or worn, clean or fouled. Also it must "stay put" at low speed and at high speed, moving forward or backward.
2. It should not cause excessive wear of the contact line.
3. It should be able to collect without damage to itself or the contact line currents ranging from 50 to 1,500 amp. at low speed and from 150 to 300 amp. at 60 or 70 m.p.h.
4. It should be cheap both in first cost and maintenance and it should be readily replaceable. Also it should have long life.

As some of these requirements are incompatible, the actual device must necessarily be a compromise.

The operating, equipment and power departments of the railway, all are interested in the contact device. The operating department is responsible in a large measure for the trains or cars being on time. From the point of view of this department the device must be one which will stay on the wire under all conditions of service. It should not be necessary to make stops to replace the trolley, and trainmen have a natural and well-founded objection to clambering up on top of the car in foul weather. The equipment department is interested in the first cost, maintainence and replacement of the device and also objects to having trolley poles bent and trolley bases loosened or torn away. The power department also scrutinizes the trolley wire for wear and objects to having a trolley pole running amuck in the overhead system.

To merit commercial success the contact device must meet the just requirements of all three of these departments and the best test is the test imposed by every-day service on the cars. As regards the life of the device and the wire with which it makes contact, laboratory tests are of some value in indicating factors which affect life. During the past ten or fifteen years we have made a number of tests on trolley contact devices at Purdue University. The results of one series of tests is illustrated by the data given in Table I for a 6-in. U-groove wheel collecting 100 amp. trolley tension of 30 lb. They are approximate averages as read from graphs plotted from the test data. The friction loss includes both the trolley wheel bearing loss and the wheel-to-wire contact loss. It will be noted that the electrical loss at the contact is greater than the mechanical loss.

TABLE I—TROLLEY CONTACT DATA

	Electrical Losses		Mechanical Losses
Speed	Wheel-Wire Contact	Bushing Contact	Friction
10 m.p.h.	10 watts	13 watts	20 watts
15 m.p.h.	50 watts	17 watts	26 watts
20 m.p.h.	80 watts	40 watts	36 watts
25 m.p.h.	125 watts	80 watts	50 watts

With a car running at 60 m.p.h. a 6-in. trolley wheel will run at a speed of approximately 3,360 r.p.m. provided there is no slippage between wheel and wire. There is undoubtedly some slippage. We would expect the slippage to be more or less dependent on the relative frictional losses at the bearing and at wheel contact. A number of different investigators have attempted to measure the slippage but the results secured have not been very satisfactory because the device for measuring slippage affects the quantity being measured.

Several years ago we made tests on a number of interurban cars in order to determine the loss at the contact. We found that at speeds between 35 and 45 m.p.h. with a 6-in. wheel collecting 200 amp., the loss ranged from 400 watts for smooth running to momentary values of 15 kw. for occasional arcs at trolley hangers and rough spots on the trolley wire.

Later we made a number of tests with both wheels and shoe, measuring the voltage drop at the contact with a graphic recording voltmeter. We found that the chart of the meter was a true record of the rough spots on the wire, each rough spot being indicated by a "throw" of the meter pen. At higher speeds the "throws" were large in magnitude and numerous. Summarized, other results of these tests were as follows:

1. The graphic meter record shows increased voltage drops at practically every hanger.
2. There was far less arcing with the sliding shoe than with the wheel trolleys.
3. The power loss at the contact for smooth running was practically the same for all devices.
4. The ability of the shoe to stay on the wire was largely dependent on the angle between the trolley pole and the wire. At an angle of approximately 20 deg. the shoe was as satisfactory in backing as the wheel. With larger angles, such as 45 deg. the shoe was not very satisfactory when backing.
5. In general the shoe ran quieter than the wheels and the irritating vibration from the trolley base which so often manifests itself when the car is running at a greater speed than 35 or 40 m.p.h. was not as great with the shoe as with the wheels.

It may be said that the loss at the wheel-to-wire contact is not in itself important. Its importance lies in the fact that the wear on a part is largely a function of the energy expended on the part. The arcing causes pits or rough spots on both the contact device and the wire and these rough spots in turn promote wear by abrasion. Even when the wire is smooth and no arcing occurs the electrical loss causes highly localized heating and this in turn causes tiny pits and thus roughens the surfaces in contact. It is possible that wear might be reduced somewhat by the use of a proper lubricant properly applied to the contact surfaces.

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*Abstract of discussion on "Merits of Sliding Contact Shoes" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Sliding Contact Superior on Interurbans*

By J. W. Osborne
Superintendent of Equipment Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

The interest shown in the sliding contact shoe is evidence in itself that the trolley wheel is not satisfactory for interurban service at least, and that a better trolley device would be welcomed. For interurban service I believe that most of us consider a sliding contact far superior to a wheel, but that the shoes have not yet been perfected.

For high-speed, heavy interurban service, for motor car trains with only one trolley pole up, and for electric locomotives some form of sliding contact shoe becomes almost a necessary as shown by the experience of such roads as the North Shore Line and the Interstate Line.

Many object to the use of the slide because they think it does more damage to the wire than is done by the wheel. In this connection I have been told that some have observed that on grooved trolley wire presenting a smooth running surface the wear caused by the slide is not as great as from the wheel, but that on round wire the slide soon wears away the edges of the ears and lets the trolley drop. It seems to be a question not yet decided whether the wheel with its poor contact and severe arcing is not more destructive to the trolley wire than the slide with its reduced tension against the wire, good contact and practically no arcing.

In testing the slide the rest of the trolley apparatus should be given careful attention. The slide can be operated with much less pressure against the wire than the wheel, due to its smooth sliding contact as compared to the rolling, jumpy contact of the wheel. This lessened pressure between the shoe and the wire should materially reduce the wear on both. A new type trolley base with approximately uniform tension for all heights of wire will undoubtedly give better results than the old type base in which the tension is reduced as the pole rises. I think a long, flexible trolley pole will give better results than a short, stiff one.

In regard to the performance of the sliding shoe as compared with the wheel, my experience has been that it rides the wire much better, does away with the objectionable noise and vibration so common with the wheel, cuts through sleet better, and gives greater mileage. In fact, the shoe does better than the wheel in every way except in backing up; and with so many working to improve the slide I think it will be but a short time until some design is perfected that will not have this defect. We are now trying out a slide fitted with a small wheel at the back which does permit of backing up without having some one at the rope. All the motor cars, about twenty-five in number on one division have been fitted with these slides, but we have not conducted the test long enough to make a report except to say that one of these slides ran thirty-four days for a total of 8,773 miles.

I am of the opinion that in the near future some form of sliding contact shoe will be developed that will replace the wheel for interurban service.

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*Abstract of discussion on "Merits of Sliding Contact Shoe" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Reclaiming Joints in Indianapolis*

Results Obtained and Costs of Reclaiming Track in Paved Streets with Three Types of Welding—How Rebuilding Has Been Deferred

By T. H. David
Principal Assistant Engineer, Indianapolis (Ind.) Street Railway

Except for a few locations, the track in Indianapolis was largely reconstructed during the reorganization period from 1899 to 1902. A very large amount of this reconstruction became necessary because of the increase in weights of city cars and the advent of the heavier type of interurban cars which operate over the city tracks. Indianapolis has a total of approximately 153 miles of revenue track of which 88.6 miles or 58 per cent is used by city cars only and 64.3 miles or 42 per cent by city and interurban cars. This track construction is classified as follows: 1st Class—90-lb. rail and heavier on concrete base; 62.9 miles; 41 per cent; 2nd Class—90-lb. rail and heavier on gravel ballast; 74.8 miles; 49 per cent; 3rd Class—Rail of lighter sections on gravel ballast; 15.2 miles; 10 per cent.

Of this total revenue track, 14 miles, or about 9 per cent, is comprised in special work layouts and curves. We have about 250 special trackwork layouts in the city, of which thirty are in the downtown loop district. Of the total mileage involved in these layouts, interurban cars operate over 50 per cent in the loop and 33⅓ per cent in the districts outside the loop. These thirty layouts represent an expenditure of $300,000 with nearly $100,000 additional for pavement.

Quarter Billion Ton-Miles in 1920

During the year 1920 the mileage made was as follows: City cars, 12,490,988 miles; interurban passenger cars, 984,502 miles; interurban freight cars, 152,301 miles; total, 13,627,791 miles. In terms of ton-miles this amounted to 241,950,438 ton-miles for city cars, 35,122,819 ton-miles for interurban, and a total of 277,073,257 ton-miles. This is an average of 1,800,000 ton-miles per mile of track. These figures are for dead-load only, and they do not include any miscellaneous cars such as work cars, sweepers, etc.

Our experience has shown that first-class track in paved streets should not require maintenance for a period of ten years when subjected to a normal amount of traffic of, say, three-minute headway with city cars or about eight years if hourly interurban service is carried in addition.

Experience With Lorain Weld Joints

In 1913 we welded 3,000 joints on both old and new tracks, using the Lorain electric weld. This type of joint proved very serviceable and has prolonged the life of track so reconstructed. We have had several instances where the wear on the ball of the rail has decreased its section until it no longer had sufficient stiffness to carry heavy loads and failed by fracture immediately below the ball at the juncture with the web, the joints remaining in fairly good condition. One case is the track on College Avenue between Massachusetts Avenue and Fall Creek, consisting of Lorain Section 80-335 7-in. high T-rail laid in 1902. This was the first concrete construction, full tied track in the city, and carrying probably the greatest mileage and tonnage of any track outside the loop district. There is no doubt in our minds that the welding done on this in 1913 prolonged the life of the joints and saved the maintenance cost of the pavement which usually gives the first evidence of joint failure. The paving on this street, excepting at the joints which was naturally repaved with the welding, and excepting 18 in. outside the rails relaid at the time of street reconstruction, is the original paving laid in 1902. Up to a year or so ago the appearance of wear was uniform, that is, the dip and bad pavement at each joint, usually identified with bolted construction, were missing.

Failure of this method of welding usually occurs by ordinary vertical break immediately adjacent to the weld, or the ball of the rail breaks out over the weld. This has been our experience with old rail and we think it partly due to stresses resulting from lack of periodical grinding. The welds made on new rail up to this time have been very satisfactory and the breakage has been considerably less than 1 per cent. One track containing 250 such welds with about eight-minute city service has had no breaks.

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*Abstract of paper presented before Central Electric Railway Association's annual convention at Indianapolis, Ind., Jan. 26 1922.

ARC WELDING ON OLD TRACK REASONABLY SUCCESSFUL

From 1914 to about 1918 no welding of new track was done, but considerable resistance arc welding was done on old track of all sections. This method of welding has proved reasonably successful and has only been resorted to in old tracks which we hoped to reconstruct in the near future. Some 14 miles of 70-lb. track, most of it twenty years old, has been welded since 1912 with the arc welder. Our method has been to cut the base of the angle bar on the gage side and invert the bar on the outside, thus giving the outside of the ball a support. In some cases where tracks were out of surface we have re-tied the joints and a few feet each side, tamping the joint and leaving the quarters suspended for a day or so under traffic. By this method a considerable amount of the surface bend can be ironed out. Instead of using plain gravel for this work, we used a mixture of cement and gravel in the ratio of about 1 to 7. In some cases we bonded around a joint of this type in order to insure the proper return. Some of these welds have proved exceptionally good while others failed, the greater percentage failing by the weld breaking loose. It appears that this class of weld can be made to give good results, but the personal equation enters to a greater extent than in some of the other methods of welding.

Another piece of track reclaimed by the use of the arc welder consisted of 90-lb. Lorain Section 206 in 30-ft. lengths which was very bad looking before reclamation. The rail was laid in 1894 and on very little ballast, and while small repairs were made in 1910, a complete reclamation was made in 1916 and 1917 with very satisfactory results. Twenty-five per cent of the ties were renewed, mostly at joints, and every joint was welded. In some cases where bolts were loose, the plates were removed and cleaned; and if the bolts were tight, the old plate was welded by adding a ⅛-in. square rod along the top of the plate to carry the welding strip. Tie plates were put under all joints, these plates being old 9-in. flat joint plates. All cups in the ball of the rail were filled by arc welding and then ground to surface with a rotary grinder. The track was very smooth riding when completed and the results were gratifying. This track carries 20-ton cars and is a short line with a ten-minute service. No bonds were used, and as a rule they are not used in this type of weld except on trunk returns. In all, some 500 joints were welded at a cost of 90 cents per joint for trackwork, and as the entire street was repaved with brick and stone liners, the paving was $1.50 per square yard. This low cost per square yard is due to the fact that portions of the paving base were not disturbed. The total cost was $15.460 or $2 per lineal foot of single track.

As usual, dry mix was used to bring some joints up to proper surface. This small expenditure per foot has again put this track in condition to last at least eight to ten years with present traffic conditions. Considering the fact that the rail at the time of welding was twenty-two years old, we cannot expect much more. Up to date we have had only one break, this record being due perhaps to the class of welder we had. In this case credit should be given to the personal factor in obtaining the foregoing results.

Two years ago a double-track electric over single-track steam 90-deg. crossing made of solid manganese broke down at several of the frog points and appeared to be destined for the scrap pile after only six years service. As a last resort we tried arc welding, using gasoline and a wire brush to clean fractures thoroughly. The points were then built up, soft steel being used and applied in thin layers, each layer being pounded with a hammer while hot to compress the metal. This process was continued until it was built up to the last ⅛ in. and then hard steel of the grade recommended for manganese work was added. This crossing remained in fair condition for some time but in the two years the points have been rewelded twice by the foregoing method, as the welded portion disintegrated by flaking off.

THERMIT WELDING COSTLY BUT JUSTIFIED BY RESULTS

In 1917 we became interested in Thermit welding, but up to 1919 the use of it was limited to combination joints and built-up frogs, the latter being the result of the high prices prevailing for special pieces. If the Thermit method of rail fastening is used, we find that there are three grades of rail that can be welded, with some question as to the wisdom of so doing with the last two: (1) new rail; (2) rail that has been in service for about eight or ten years with moderate traffic, and joints (bolted type) beginning to cup and get loose; and (3) rail of the same age or older that has been subjected to severe traffic.

In the last couple of years we have Thermit-welded two streets of the latter two types to reclaim them, with the hope that our judgment will be vindicated. On Central Avenue from Tenth to Nineteenth Streets, approximately 3,700 ft. of double track was reconstructed in 1911, Lorain Section 95-297 being used on white oak ties laid on concrete base. During the last year or so some 40 per cent of the joints showed evidence of pounding and breaking the bond with the immediate pavement. As we did not wish to postpone repairs until rail breakage developed we decided to "Thermit" all joints that showed any evidence of pounding and regrind all of the 280 joints.

A total of 114 joints were welded and ten cases of broken rail were found, these breaks occurring along the line of the bolt holes. The actual welding was done between midnight and morning, the joints being excavated and back-filled during the day on account of the street being narrow and the impossibility to keep automobiles from driving into the excavations. The original joint plates were the eight-hole continuous type, thus leaving about ⅜ in. space between the base of the rail and the tie after welding. Tie plates ⅜ in. x 8 in. x 10 in. were used to give bearing and spot-welded to the base of the rail to hold them in place, as in most cases the ties were cut away to permit the necessary width for the moulds, the original spacing of ties being too close and we did not desire to excavate and respace them. This work of 114 joints was accomplished at a cost of $13.56 per joint for track and $9.84 per joint for paving; total, $23.40 per joint. As these rails were all 62 ft. in length it made the cost per foot of track about 76 cents.

Records show that the number of scheduled cars operating over this track in the ten years was 930,185 or 3,720,740 car wheels on each rail. As the cars all weighed 20 tons, it gives us 18,603,700 tons of weight per track.

This welding was completed in July, 1921, and we have had two breaks since, both of which were rewelded by waxing the joint and pouring additional Thermit.

The track on Massachusetts Avenue between Alabama Street and College Avenue is the extreme case in the types of track formerly referred to. This track was constructed in 1910 of Bessemer rail, Lorain Section 91-375, 7 in. high on white oak ties imbedded in concrete or monolithic from sub-grade to paving base. This track became so rough at the joints that it was decided to use Thermit in an effort to delay reconstruction at least three years, or for a period that would justify the expense.

The portion of the street used by vehicles was resurfaced in the summer of 1920 and this company relaid 18 in. outside the rails at that time, omitting the grouting at the joints until we could do the welding. Crossovers were placed on the streets and welding was started in October. As this is a trunk line and handles all cars to the northeast section of the city, or about sixty city cars per hour during tripper times, our welding was all accomplished between the hours of 9 a.m. and 3 p.m. and 10 p.m. and 5 a.m.; that is, in the off-peak hours.

As the work progressed we found every joint in the entire length of 2,700 ft. of street to be broken. We could not afford to remove the 18-in. strip of pavement only recently laid, so 6 to 10-ft. pieces were put in on the outside rails and welded, while the inside rails were cut and the rails were driven ahead. This method not only eliminated all the bolt holes but the cupped rails as well and also located the new joints on better ties, the old joint ties being cut severely in several cases. Where ties were cut, they were adzed and either steel or wood shims with holes drilled in them for spikes were added to bring to surface.

Before track and paving gangs had completed the work we had eleven breaks due to the new conditions imposed upon the rail in welding. Since then we have had six breaks, four occurring during last winter and two just recently. In each case they were rewaxed and welded. A recent inspection of this track shows it to be holding up in fair shape and it appears that the expenditure made, while large, was justified. On this street, 264 welds were made at the following cost: track, $30.00 per joint; paving, $15.00 per joint; total, $45.00 per joint. As the track rehabilitated consisted of 5,400 ft. of single track, the cost was $2.20 per foot, or a total cost of $11,772.87.

Operating statistics show that during the year 1920, 319,263 trips of city cars and 55,773 trips of interurban cars, or a total of 375,036 trips were made over this stretch of track. Therefore in the past ten years 15,001,440 wheels passed over each rail. This amount of travel is equivalent to 78,681,030 ton-miles for that interval. These figures, as in the previous estimate, do not include work cars, sweepers, etc., and are based on dead load of cars only.

In preparing this paper I have endeavored to relate our experience and some of the results obtained in the reclaiming of track by the different welding methods, and have avoided mentioning the rebolting as I believe most of us are only too familiar with that process. While I think arc welding by motor-generator set reduces the importance of the personal equation and should be mentioned, I regret that I cannot offer any experience in regard to its use.

Reclaiming Track in Paved Streets[*]

Use of New Base-Supporting Joints Under Old Rail May Double Life of Rail for $8 to $12 per Joint—Other Elements of Track Reclamation Discussed

BY L. A. MITCHELL

Engineer Maintenance of Way, Union Traction Company of Indiana, Anderson, Ind.

THE reclaiming of track in paved streets is in reality the reclamation of joints. Track trouble starts at the joints, and the methods that have been tried to hold the joint construction so that the rail ends would not be ruined are probably as numerous as the sections of rail used.

The best method of repairing track is one that will extend the life of the track structure the longest, that is, giving you the greatest return on the investment. This best method these days depends to a very great extent on the money available to make the necessary repairs. It is not so much what shall be done as how much money can be spent.

In reclaiming track the effort is made to eliminate the joints as far as possible and make the rail continuous by making the joints just as strong as the rail itself between joints. This is done in various ways, such as placing steel plates on the ties under the rail at the joints; placing steel ties under the joints; buying new joints and applying to the old rail; welding the old joint bars to the rail; welding specially designed joint bars to the rail; taking old joint bars and inverting them and welding these to the rail; buying new base-supporting joints with larger bolts and redrilling the rail so as to construct an absolutely tight joint.

The Union Traction Company has approximately 60 miles of track in paved streets and approximately the same amount in streets that are unpaved. The track in paved streets as originally constructed of 70-lb. A.S.C.E. rail, 80-lb. A.S.C.E. rail, 6-in., 60-lb. rail Lorain Section 263, 6-in., 72-lb. Lorain Section 331, 5⅜-in. 60-lb. rail Illinois Steel Company 6012 and some of 40-lb. T-2 rail. Our interurban service operates over a little more than one-third of this mileage and naturally this portion of the track in paved streets has presented the greater part of our track problems.

The track on which our ordinary city service is operated has required comparatively little attention until from ten to fifteen years old, depending principally on sub-soil conditions. But the track in paved streets constructed for ordinary city service and then subjected to the interurban service has required attention in a much shorter time.

In repairing city tracks, of course, the first consideration is the foundation. Good drainage should be provided if possible and good sound ties under the joints. Then it is a question of how the joint itself should be dealt with. We first tried the installation of a plate on the ties under the rail which would hold the rails in position without deflection, and these plates were in many cases spot welded to the base of the rail. This proved a very satisfactory method, but of course did not remove all the pound due to the battered rail ends.

Another method that was tried with varying success depending on the age of the rail was the inversion of plain bars and spot welding them to the ball and the base of the rail. Practically all of the rail that was treated in this way was more than ten years old and considerably worn, and we had a large number of breakages in the rail in the web running along under the ball. This method gave us fairly good track for two to three years at a cost of about $4.50 per joint, including the labor of removing and replacing the paving as well as the labor and material in welding.

A few patent welding bars were installed and these gave very good service, and probably would have given better, had it not been for the age of the rail, which broke above the welded bar and under the ball of the rail. In many cases where we inverted the joint bars and welded them to the rail we found that enough of the ball of the rail had been worn off to allow the wheel flanges to strike the bar on the inside. This would ultimately break this bar loose from the rail. We then inverted only the outside bar.

On three or four occasions and at different locations we tried the installation of steel ties filled with concrete for repairing joints on old rail. Owing to the fact that the pound was not entirely removed from this joint we discovered that ultimately the foundation would be broken up and the steel ties bent so that they finally had to be removed. However, this same type of tie in concrete on new construction work with a tight joint was found to be as good as can be obtained.

BOOSTER TIES ON OLD RAIL

We have used a few of the so-called booster ties for old rail in paved street with very good results, probably due to the fact that this tie is cushioned and the shock is absorbed before being transmitted to the adjacent pavement. Spot welding has been used to great advantage in the repair of special work. Many times the life of a frog has been extended a year with an expenditure of $5 by building up battered down joints or filling spaces where pieces of metal have broken out.

I believe that the best results can be obtained on old rail by the application of new base-supporting joints with the same drilling as that in the rail so as to butt the end of the rails together and not allow for any expansion or contraction. The holes are then reamed out so as to use a larger bolt than the original. This bolt should be a machine bolt. The rail should be run tightly together before this joint is applied, and if the rail ends are badly battered the battered portion should be cut off and the rails run together and the joint entirely redrilled. In this way a joint mechanically tight is secured, probably having the same strength as the rail itself so that the wheel loads can be carried without over-stressing the metal. In addition to the application of the new joint the surface of the rail should be welded and ground so as to eliminate all pound. If the joints are kept tight, expensive repairs can be delayed by frequent welding and grinding of the surface of the rail.

Work of this kind can be done at a cost of from $8 to $12 per joint depending on the section of rail and the condition of the ends of the rail. I believe a joint of this type will last the life of the rail. These same results can probably be obtained by the use of the Thermit weld but at a slightly increased cost over the figures above mentioned. As yet we have not used this type of weld on our lines, due principally to the small number of joints to be repaired at a given location.

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[*] Paper presented before the annual convention of the Central Electric Railway Association held at Indianapolis, Ind., on Jan. 26, 1922.

I believe that the secret of long life track is to construct an absolutely tight and rigid joint either mechanically or by welding so that any movement or deflection that takes place will be of the same character as takes place in the rail between the joints.

Track Reclamation Costs From Fort Wayne*

By H. V. Norford
Superintendent Maintenance of Way, Indiana Service Corporation

In deciding on the work necessary for the construction and reconstruction of track in paved streets, it is necessary to take into consideration the fact that every track of permanent nature must have a permanent track foundation; all pavement should have a foundation sufficient to out-wear the rail and pavement, and all ties and other accessories, embedded in the pavement foundation must have equal life with it.

Engineers agree that in a track a pavement foundation if properly laid and drained will last from fifteen to thirty years, depending on the tonnage and frequency of car service and the amount of vehicular traffic passing over it. There is, however a large difference in the life of the track foundation and the pavement foundation and this prohibits the casting of the concrete track foundations and the pavement foundations in one mass. They are separated with a cushion of stone under the base of the ties, which gives a very resilient foundation for the rail. When the rail is worn out and the ties need replacing this construction permits this part of the structure to be renewed without destroying the track foundation. It also allows tamping and rewelding of joints if necessary without building an expensive patched foundation for some distance each side of the rail trouble. The pavement foundation, being only a filler between the ties and not cast to the subfoundation, is more easily removed than the other classes of concrete foundations.

Again on heavy traffic streets the pavement foundation and ties in this class of construction will out-last the rail, and if new rail is laid the only structure that need be removed with the rail is the pavement surface. This can be done without much additional loss to the sub-foundations in resurfacing joint ties or when welding joints by any of the modern methods.

When the pavement surface becomes worn to such an extent that it is impossible to make satisfactory repairs by patching our practice is to take up the entire surface of brick. Joints are welded if necessary and rails are respiked to proper gage and line and that portion between the rails paved with the brick taken up as far as the quantity of good brick reclaimed will admit. All new brick is placed on the 12-in. margin outside of the rail.

This construction provides a track foundation from 6 to 10 in. in thickness upon which is laid a track of either 6-in.—60 lb. 7-in—91 lb. or 100 lb. A.S.C.E. T-rail, as the tonnage warrants. White oak ties 6-in. x 8-in. x 7-ft. spaced 2-ft. on centers are laid upon a 2-in. tamping cushion of ¾-in. crushed stone with a 6-in. paving foundation between and around the ties. Pavement of either a 5-in. granite block or 4-in. vitrified shale block with a mixture of the proper amount of fire clay is used as the vehicular traffic demands; all pavements being sealed with cement grout of a 1:1 mixture. These methods of track construction and reconstructon are outlined so that the data given later may be more readily understood.

Mr. Mitchell in his paper said that "the best method to use these days depends to a very great extent on the money available for making necessary repairs." There is a certain definite point where maintenance should cease and the entire structure should be reconstructed. This limit should be definitely decided by the engineering department before any great amount of money is expended on a worn-out structure. In order to determine the definite turning point, the cost of reproduction not only of the entire structure but of every detail thereof based on current prices must be known together with the depreciation of each and every part thereof.

The following costs were compiled from Fort Wayne construction. From 1910 to 1913 Class A construction 7-in. rail and 8-in. track foundation cost $14.57 per lineal foot. In 1921 the same class of construction cost $25.12 per lineal foot of double track itemized as follows for an improvement of double track 1,832 ft. in length.

Track work	$17,747.00
Bonding	135.00
Track foundation	8,932.00
Drainage	952.80
Pavement and pavement foundation	17,588.86
Repairs to overhead work	666.00
Total cost	$46,021.66

This gives $25.12 per lineal foot of double track.

The increased cost of a few materials f.o.b. Fort Wayne were as follows: Rail in 1914 was $38 per gross ton and in 1921 it was $66 per gross ton, or an increase of 74 per cent. Cement in 1914 was $1.20 per barrel and in 1921 it cost $2.42 per barrel net, or an increase of 102 per cent. Ties, white oak, 6 in. x 8 in. x 7 ft. in 1914 were 78 cents each and in 1921 $1.38 each, or an increase of 77 per cent. Paving brick in 1914 were $20 per thousand and in 1921 were $42.50 per thousand, an increase of 112 per cent. Cast welded joints in 1914 cost $10.22 each, in 1921 they cost $17.84. Arc welded joints in 1921 cost $4.64 each by welding old joint plates with new 1-in. bolts to the rail and by welding an 8-in. x 12-in. x ⅝-in. steel girder plate directly under the joint. We also found by metering current used on each joint for approximately 540 joints that the power cost was 88 cents per joint.

Approximately 300 joints were welded by the Thermit process to 7-in.—95-lb. rail in the fall of 1920 at a cost of $15.23 each. This work was done under a three-minute headway of service and an average of twenty joints per day was made. Our Thermit welding varies from $14.60 per joint to $23.50 per joint, depending on the number of set-ups we are able to make per day. This includes finishing the joint but not paving. Paving on the above welding ranges from $4.10 to $8.60 per joint.

This year 7-in.—91-lb. rail costs $1.76 per lineal foot of track, and 6-in.—60-lb. rail costs 81 cents per lineal foot of track. Pavement in 1922 costs in Fort Wayne $5.36 per square yard.

In view of the above costs I believe we should thoroughly inspect and study depreciated track structures before applying a cost of from $2 to $5 per lineal foot of track for joint troubles, especially as in the very near future we may be required to repave or reconstruct this structure. Railways should hesitate before placing this additional welding expense on a track that is out of line and surface, with pavement loose along the rail so as to allow the surface water to penetrate the substructure. They should also hesitate before building welded special work layouts in their own shops to replace bad special work in track structures which with fixed overhead expenditures places the final cost of this work on a par with manufactured special work. I do not favor the "slapping" of any old kind of welding material on top of a rail ball that has from ten to fifteen years life in it in order to eliminate the pound on the joint, where the right treatment is to raise the joint properly, weld it and grind the ball to a true surface.

When the cost of reclaiming joints on old worn rail plus the pavement and repair costs per annum equal or exceed the interest and investment on a new structure, I think it is time to consider complete reconstruction.

Welding Postponed Rail Renewal*

By R. J. Custer
Engineer of Way and Structures, Interstate Public Service Company, Columbus, Ohio

The Interstate Public Service Company fortunately is not burdened with the large mileage of city tracks as are most companies, yet we have had our problems proportionately.

We have several miles of track in

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*Abstract of discussion on "Reclaiming Track in Paved Streets" at the annual meeting of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

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paved streets laid with 4⅞-in., 75 lb. T-rail over which operate 28-ton interurban cars. About 800 joints in this track were repaired by placing a ⅞-in. x 5½-in. x 24-in. iron plate under the joint, inverting the angle bars and spot welding the plates, bars and rail together. Surface welding and grinding finished the joint. This method of joint repairs has proved very satisfactory, considering the type of track to which it was applied. Very few breakages have occured. Those that have shown up were no doubt due to tension strains set up by the contraction of the rail, as it is impossible to get any anchorage in the concrete track structure with a rail of this depth.

In Columbus, Ind., we have about 3,800 ft. of track in a brick-paved street laid with a 4½-in. 60-lb. T-rail. The operation of 48-ton interurban cars over a track of this sort is very destructive of the track and pavement. This was a condition which we inherited and we had to make the best of the situation. We have managed to nurse this track along for the past three years with the liberal use of the electric welder. Without the aid of the welder we would have had to renew the rail. However, we are now experiencing a great number of rail breaks at the joints due, no doubt, to the heating effect of the welder. No particular method was used on the joints. Where bars were inverted for welding the flange of the angle bar was cut off with the oxygen flame before welding. We feel that we have about reached the limit in patching up the present rail.

We recently rebuilt 1,500 ft. of track in a paved street which had been in use for twenty-five years. This track was laid on white oak ties with an $8\frac{5}{32}$-in., 90-lb. rail of the side-bearing or girder type. Under the track was a ½-in. concrete floor on which the track was surfaced and filled in with crushed stone, apparently a crusher run product. Over the crushed stone filling a 6-in. concrete foundation had been laid for the brick surface of the street. When we opened up the track we found that the ties were badly decayed and it was necessary to re-tie the entire track. We did not salvage more than twenty ties out of the original installation.

At each joint there was a decided cup in the end of each rail due to the bending down of the rail head. The joint bars were of the usual flat kind used on rails of the girder type, having twelve 1-in. bolts to the joint. We found all the joint plates absolutely tight, not only from the generous supply of bolts but in addition they were thoroughly rusted fast, so we took particular pains not to disturb them. After the track and pavement were completed we filled in the cupped rails with hard steel by means of the electric welder and ground them to a true surface. This gave us a nice, smooth track free from any pound at the joints, and with the light-weight cars which operate over it we should receive many more years of service from the original rail.

Special Joint Supports Prove Highly Satisfactory*

BY M. ACKERMAN

General Manager Cincinnati & Dayton Traction Company, Dayton, Ohio

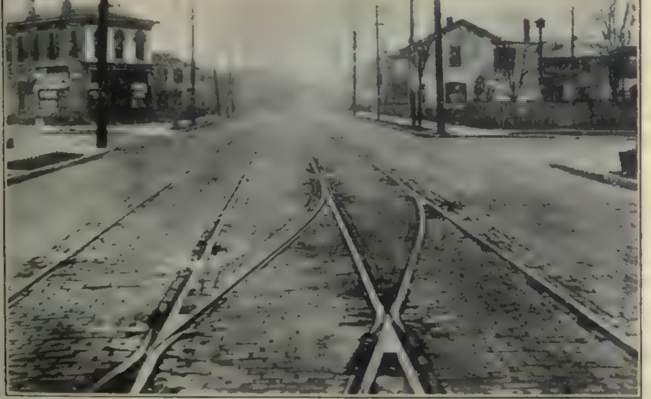
THE accompanying photographs show the condition of some track in Hamilton, Ohio, when reclamation was started and when the work was completed. The tracks shown had been repaired only twelve months before, when the old-time method of placing shims under the rail, and in some cases retamping the gravel under the ties, was used. The frequent repairs made necessary by this method ran our maintenance charges up very high, as we operate cars varying in weight from 15 to 50 tons.

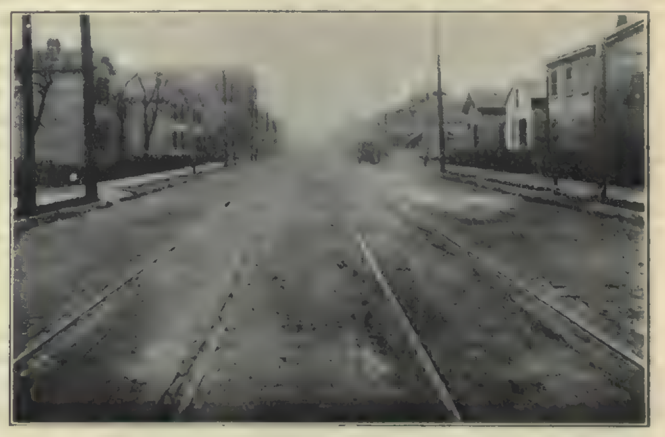
These constant, unsatisfactory repairs made us look around for some other method, even though it might cost a little more, but we wanted something that would give us a more lasting job. We investigated the Dayton joint booster, because we believed it hit at the cause of our track and joint failures. As is generally known, this joint booster offers a broad bearing surface for the rail ends, and at the same time provides a means of using dry concrete under the booster itself for a foundation.

We have always believed that concrete offered the most lasting foundation for track, when it can be protected from the pounding which every track receives, especially at the joints. This protection is provided by the asphalt cushion, which is built into the booster itself. The heavy steel plate that is used on the booster block enabled us to weld the base of the rail to it, and we also weld the angle bars to the rail, thereby, overcoming the necessity of bonding. If the rail ends were battered, as they were in most cases, we filled up the cupped portion with new steel and then ground it down to a smooth surface.

SHOWING HOW TRACK WAS OPENED UP FOR INSTALLATION OF JOINT BOOSTERS AND RELAYING PAVEMENT

Our work of reclaiming tracks by this method has been going on now for two or three years and to date we have reclaimed approximately 5 miles of single track in Hamilton, where we use 80-lb. T-rail in 30-ft. lengths, about a half mile of single track in Miamisburg and 1½ miles of double track in Dayton, where we use Lorain Section 91-375 in 60-ft. lengths. The track in Dayton has boosters under about 75 per cent of the joints. The other 25 per cent appear to be in good shape, so we did not consider it necessary to disturb them at this time.


TYPICAL APPEARANCE OF TRACK AND PAVING BEFORE RECLAIMING


TYPICAL APPEARANCE AFTER REPAIRING JOINTS AND PAVING

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*Abstract of Discussion on "Reclaiming Track in Paved Streets" at the annual convention Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

The work in Hamilton, where the track and paving were in such bad shape that practically 50 per cent of the paving had to be repaired, was done at a cost of $13.88 per joint, exclusive of the cost of repaving, and $23.81 per joint including paving, or 93 cents per lineal foot of single track exclusive of paving, and $1.60 per lineal foot of single track including paving.

In making a permanent repair of this kind, we saved ourselves the expense of rebuilding, which would have meant new rails, new ties, and all the inconveniences that go with reconstruction, while this work was done without any disturbance to traffic. In fact, the continuous operation of the cars over the track helped to tamp the concrete under the booster and consequently got it seated more firmly. To date we have not had a single failure, so that this method has more than proved its worth.

The expense involved at Hamilton and the results obtained were so satisfactory that when the city commissioners of Dayton were giving serious consideration to the repaving of South Main Street, we stepped in and made our repairs the same as we did in Hamilton, and forestalled the improvement at this time as far as the railroad is concerned. This work, consisting of placing the boosters under 75 per cent of the joints, welding and building up the cupped rails, and repairing all the bad paving, whether at the joints or in between, cost us 70 cents per lineal foot of single track, and was done without any interruption to traffic.

You can readily see that we have effected a tremendous saving over the cost of new track and paving, and are thoroughly convinced that our manner of reclaiming track is the best known method today, and will give us years of additional service out of the old track.

Trot Out the Cookie Jar*

A Refreshing Discussion on Public Relations—Some Valuable Hints on Advertising Methods and Relations to Newspaper Publicity

BY LABERT ST. CLAIR

Director Advertising Section American Electric Railway Association

THE more I see of public utility managements that are successful in their public relations work, the more I am reminded of the methods by which Aunt Sally Ann Dusenberry made herself the best-liked person in my home town out in western Indiana and also got folks to do for her the things which she wanted done.

Aunt Sally Ann was a widow, capable, past forty probably, the possessor of a house that was immaculately clean, a disposition that was always congenial, and a two-gallon brown stone jar that was always full of cookies. Folks were naturally attracted to her house by its extremely clean and inviting interior and exterior, and also by the big-mouthed cookie jar. Aunt Sally Ann had more visitors and friends, I reckon, than anybody else in town. They ranged from boys in knee trousers and little girls in long skirts to the oldest inhabitant who bragged that she was so aged that she had worn out three sets of vitrified false teeth.

GOT THE WORK DONE

Aunt Sally Ann had a powerful lot of work to be done around her house and she always seemed to get it done with the minimum effort. In fact, the mothers of various boys around town wondered how Aunt Sally Ann induced their offsprings to carry in her wood, cut her grass and do other little chores so willingly when they found great difficulty in inducing the boys to do anything. The answer to this situation was that the mothers usually ordered their boys to do the job or suffer the consequences, and Sally Ann took the other way around and got the job done by arousing their self-interest in her cookie jar.

And so, as I frequently come in contact with the public utility managements of the country which are making a success of their public relations and those that are making little progress with theirs, I seem to see an analogy between their methods and those of Aunt Sally Ann and the boys' mothers.

We might consider for a moment the fact that Aunt Sally Ann always had her house in order to see if there is any analogy between this and the public utility men who are getting public co-operation. I think there is a very distinct analogy. If you will investigate the background of the managements that are enjoying pleasant relations, you will find that these men long since have put their houses in order either by explaining a way through advertising any misapprehensions that the public may have had about the cleanliness of their houses, or by sweeping out dirt where it actually existed. I do not mean by this that all companies which are not enjoying good public relations necessarily do not have clean houses, but if there be any which haven't, it might be worth while to consider sweeping up as a progressive step.

The second attractive feature about Aunt Sally Ann's public relations is, unfortunately, one that still requires much attention in the public utility field. That is, her never failing cordiality and willingness to meet people with a smile and not lecture them despite whatever personal troubles may have been on her mind. The public cares very little indeed for the personal troubles of anyone and it cares still less for the troubles of a public utility unless it can be shown that these troubles are in reality the consumers' own.

There has been much complaining through paid advertising in the public utility field in recent years. I agree that there has been justification for it. Scores of progressive executives with whom I have discussed this question, however, are very doubtful, indeed, if the manifold efforts to excite pity for public utility industries has developed favorable results.

Entirely aside from any complaining which our industries may have done in print, there is need for more cordial contact between many managements and the public. Make a survey of the public utility field and you will find that those men are getting ahead who are meeting the public in the open, who are courting their customers with a smile, in their own offices or in public meetings, and who are always available for frank conference.

Leaders in the electric railway field invariably are those who have ripped out the frosted glass between them and the public.

We now come to the last feature of Aunt Sally Ann's public relations program, which I believe, is the most important feature of all of it. That is the fact that she handed out cookies instead of orders.

The only way on earth to induce people to do things that you want them to do is to arouse their self-interest in your proposal by showing them where it will benefit them. It is true that you can get some things done by ordering folks to do them, but a friendly, co-operative spirit, a desire to come back and do more things for you, is not created in this way. *You must show them the cookie.*

THE MANAGEMENT COOKIE

The first step toward all good public relations is for the management to hold out a promise of a cookie to itself. There are many kinds of cookies to which all managements aspire. There is the increased income cookie, which, of course, is of interest to us all, but there are others. Hard-working public utility managers throughout the United States seek the cookie of satisfaction from giving good public service and from being a real power for good in building up their communities. It is vital to success.

THE EMPLOYEE'S COOKIE

Co-operation of employees is absolutely essential to good public relations. Cookies will get it. Altogether too many persons are prone to believe that the only cookie in which the employee is interested is the increased wage cookie. Of course he is interested in that, but there are many other kinds of cookies he cares for. There are thousands of capable, loyal, energetic public utility employees who are putting forth their best efforts to help advance their company interests because of their pride in real accomplishment and not alone for the monetary return that their efforts bring them.

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*Abstract of paper presented before Central Electric Railway Association, Indianapolis, Ind., Jan. 27, 1922.

Courtesy is the biggest sales developer for a public utility company that an employee can possess, and untold numbers of them are courteous not because to be courteous means a few more dollars in their pay envelopes but because it is a distinct pleasure to them to treat people cordially and politely. A few signs around public utility offices, in street cars, and in other places where the public comes in contact with employees saying that the employees are picked because they are courteous fills the employees with pride in their work, which is a cookie much to be desired.

Again, the substitution of names of employees for numbers, as in the case of conductors and motormen, or the placing of name plates on the desks of employees gives them a feeling that they have ceased to be mere cogs in the great public utility machine. They have become men and women charged with the responsibilities of sufficient importance to make them meet the general public on the same ground as do good salesmen and bring their individuality into play. And who will say that feeling is not a cookie?

THE NEWSPAPER COOKIE

The importance of enlisting newspaper support in every community cannot be minimized and here again cookies can be used to advantage. I know that it is the custom for persons who have not made a careful study of the real workings of newspapers and their proprietors to say that you can buy the support of any newspaper in the land if you approach it with an advertising contract cookie of sufficient size. I do not believe for one minute that this is true. Of course, all newspapers are interested in advertising contract cookies, and they are not to be blamed for that. They thrive on advertising and it is proper that they should sell it and it is entirely proper that the men who use their space should pay them for it.

But the advertising department of a newspaper is only one department.

There is the news section which is just as anxious for its news cookie as the advertising section is for its advertising cookie. The editorial staff of a newspaper has only a passing interest in the advertising department, regarding it as a sort of a necessary evil whose duty is to fill up blank space in the paper not required for news. The cookie that the editoral staff desires all the time is news. There is news on every public utility property in this country and if properly presented to the news section of a newspaper it will be seized eagerly and devoured.

At the same time it is a great mistake to attempt to present the news section with a dog biscuit in the shape of advertising that should go into the display columns and attempt to tell the editor that you have a nice wholesome cookie for him. This cannot be done very many times, and the advertising man or publicity man who continues to try it is not going to last long in his chosen field. It is a mistake for any publicity man to attempt to convince public utility operators that he can get printed free of charge material that has no news value but should go into the advertising columns. It is a greater mistake for a public utility manager to urge his advertising representative to attempt to get advertising without news value into the columns. The most that the publicity man can do is lose his job, but the public utility manager who gets in bad with the newspaper also can lose their support.

Newspapers everywhere want to do the thing for their towns that will build them up, because as their towns grow so they too will grow. Hence, the job of the public utilities is to show the newspapers that their cookie of future business lies in aiding the public utility to help build up the town.

THE CAR RIDER'S COOKIE

The car rider's cookie is good service. It is not necessary for me to dwell long on what this should be. This has been covered thoroughly at almost every public utility meeting I have attended in several years. But the selling of service to the public utility patron has not been done intensively enough from the cookie angle. Far too much money has been spent telling the public that it should support its public utilities in order that they may thrive and pay dividends. The consumer has very little interest in dividends except as the cutting off of them might curtail his service. But he does have a very vital interest in the service cookie that brings him rides. This is the cookie that must be held up to him.

THE BUSINESS MAN'S COOKIE

The cookie that attracts business men is maintaining or increasing business. Except in a few cases, such as Des Moines, where electric railway service have stopped completely and the business man's income has dwindled, the real effect that electric railway service has on his cookie has not been brought home to him.

The merchants of Des Moines did not realize that, upon the continuance of street railway service depended their cookie. So they stood by and permitted street railway service to die. But when, within a day or two, they saw their business cookie snatched away from them, they screamed to high heaven for the return of the cars and they never ceased screaming until they got them back. The mothers of Des Moines did not realize that their greatest cookie of all—the safety of their children in going to and from school—was dependent very largely on street car service until street cars stopped. When this happened they organized and worked until their cookie was returned to them.

And so it goes right down the line with every class of persons that is affected by public utilities and that means all classes.

How Motor Transport Influences Interurban Operation*

BY M. ACKERMAN
General Manager Cincinnati & Dayton Traction Company, Dayton, Ohio

MOTOR truck competition has become one of the most vital questions in the operation of interurban freight service; more particularly so since the advent of improved highways. These afford motor truck companies or individuals excellent facilities, for which they are not assessed, but for which the interurban companies are assessed.

The laws in the State of Ohio provide, particularly in the counties through which we operate, that the benefits from the improvement of public highways be assessed against all properties 1 mile on each side of them, thus giving our truck competitors a decided advantage.

It also seems unjust that the motor truck companies be permitted to utilize the highways from town to town without being obliged to file schedules of time and rates. They can thus scalp such interurban rates as are on file, arrange schedules from time to time to suit their own convenience, and can operate without any obligation, except for such moral obligation as they owe shippers.

To cope with this situation, we arranged with our largest competitor to act for us as pick-up and delivery agents in all of the principal communities on our property. This arrangement took effect May 1, 1921, and since that time sixty-four 5-ton Packard trucks have been picking up and delivering to us shipments they originally moved in competition.

Because of this pick-up and delivery the truck company provides a more frequent service than it could have under the former long haul plan. Thus it has the advantage over other motor truck competitors whose equipment is tied up in the long haul movements.

The motor truck company's advertising and solicitation brings in business, which we otherwise would not have got.

In the operation of this service our local class rates are added to the pick-up and delivery charges, making through rates slightly lower than the motor truck company's rates to the same points. But the truck company, which under competitive operation had lost money, is now enjoying a profitable business.

It is our firm belief that by the co-operation outlined above, and through the aid of proper legislation, we can reduce motor truck competition to a minimum.

All freight handled by the pick-up and delivery company is checked and loaded direct into our cars at points along our line, thereby eliminating extra handling.

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*Abstract of discussion on "Reclaiming Track in Paved Streets" before Annual Convention, Central Electric Railway Association, Jan. 26-27, 1922, at Indianapolis.

Shipments are handled from our cars to the trucks of the pick-up and delivery company which enables a consignee to receive his goods shortly after the arrival of our freight trains. The old method, of unloading into freight house, necessitated the rehandling and rechecking to the consignee's delivery.

In connection with the foregoing arrangement we have also established what we term a delivery service. For example, the trucks of the National Cash Register Company deliver the finished product to our cars at Dayton, and our pick-up and delivery company takes this material from our cars at destination and delivers it direct to the consignee.

On the other hand, a shipment of castings from Cincinnati, which is picked up by the truck company and loaded directly into cars, is called for at our Dayton station by the National Cash Register Company's trucks, thereby handling the shipment at only a slight additional charge over our class rates. This we term our pick-up service.

The inauguration of this service has had the effect of reducing our claims to a minimum. Claims for concealed damage are settled on a 50 per cent basis. On all other claims, the company responsible settles for the damages. We have experienced no difficulty in settling on this basis with the truck company.

ACCOUNTING IS SIMPLE

All shipments are billed out in the same way as other shipments delivered to the freight station. An extra abstract is prepared, one copy going to the auditor of the railroad, one copy to the pick-up and delivery company, and one copy remaining in the station agent's file.

Statements prepared by our agents for our proportion are supported by a copy of the abstract, and sent to the pick-up and delivery company semi-monthly. Payments are made direct to the agents rendering these statements.

Because of the above arrangement our 1921 freight business decreased only 11⅝ per cent as compared with 1920, which was our banner year. Our passenger business, however, fell off 16½ per cent for the same period.

In places too small for the pick-up and delivery company to operate profitably, local express men pick-up from and deliver to shippers. This takes care of freight formerly picked up by our truck competitors. The local arrangement, which is on the basis of a flat rate, has drawn considerable business, both local and interline.

If we are to develop our freight business in the face of strong motor truck competition, which is not confined to direct routes, we must utilize the same motor trucks to bring the business to our stations.

Early in 1920 we were operating between Dayton and Cincinnati, Ohio, three freight motors with a motorman, conductor and freight helper on each, making three deliveries at all points each day. The three freight motor crews were in service from twelve to fifteen hours each day, making it, of course, an expensive operation.

Later in 1920 as the business depression commenced and because of motor truck competition, it was necessary to curtail expenses, particularly in the handling of freight. We reduced our daily freight service to two crews and two deliveries at all points. This was not sufficient to put our freight business on a profitable basis, and early in 1921, in order further to curtail expenses we tried out the following schedule:

At our freight station in Dayton we have a motor and three trail cars; all freight for West Carrollton, Miamisburg and Franklin is carried in the motor; freight for Middletown is loaded into one trailer; freight for Hamilton into the second trailer; and freight for Cincinnati into the third trailer.

Shipments are received up to 2:45 p.m. at Dayton. The motor leaves at 3 p.m. with three trail cars or more, arriving at Cincinnati at 7 p.m. Local shipments are unloaded and loaded for points south, and the trail cars set in at Middletown and Hamilton.

The freight motor and trailer are then left at Cincinnati, for freight delivery and loading the following day. After having stood there all day they leave at 7 p.m. for Hamilton, unloading local shipments at the freight house and picking up one or more trailers loaded for Dayton. At Middletown a trailer loaded for Dayton is picked up in the same way.

The north-bound freight picks up all loaded trailers for Dayton, arriving there about 12 o'clock midnight. This service gives shippers one delivery each day, available at every point along our line at the opening of the freight station the following morning.

Thus with one crew we handle as much freight as we could before with three freight crews and motors. The new scheme requires only ten hours' labor, however, as against a total of forty hours under the old arrangement.

American Association News

Notes on the Midyear Conference and Dinner at Indianapolis

IN A LETTER just sent out from association headquarters, Executive Secretary J. W. Welsh makes the following announcements:

Reduced rate transportation by the "Certificate Plan" has been requested from the Railroad Passenger Associations. All those who go to Indianapolis are requested to ask for certificates when purchasing railroad tickets, for the benefit of others, whether they expect to use the reduced rate privilege on the return trip or not. It is necessary that 350 should be secured in order to obtain half rates on the return trip.

A special dinner for ladies attending the Midyear Meeting has been arranged. The same entertainment and dinner will be furnished in a separate room and the price will be $5 per cover. Reservations for this dinner should be forwarded as promptly as possible to association headquarters or to Harry Reid, president of the Interstate Public Service Company, 510 Board of Trade Building, Indianapolis, Indiana, who is chairman of the dinner committee.

Comprehensive Membership Campaign Planned

A MEETING of the American Association committee on company and associate membership was held at the William Penn Hotel, Pittsburgh, Pa., on Jan. 25. The members in attendance included F. R. Coates, Toledo, Ohio, chairman; L. E. Gould, Chicago, Ill.; P. N. Jones, Pittsburgh; H. H. Norris, New York; K. A. Simmon, Pittsburgh (representing M. B. Lambert); E. M. Walker, Terre Haute, Ind.; E. P. Waller, Schenectady, N. Y., and E. F. Wickwire, Mansfield, Ohio. There were also present Executive Secretary J. W. Welsh and, by invitation, F. J. O'Brien, Chicago, and R. W. Williams, Pittsburgh.

Mr. Welsh summarized the membership situation with regard to recent changes, and agreed to prepare a list of members in arrears for dues with a view to having them seen by members of the committee, if possible, before their names are removed from the rolls.

In regard to securing new members it was agreed that a list of "prospects" should be prepared and divided among the members of the committee for follow-up. Assignments are to be made on a geographical basis, as follows: W. R. Alberger—Arizona, California, Idaho, Nevada, New Mexico, Oregon, Utah, Washington; F. G. Buffe and Rolla Wells—Colorado, Kansas, Missouri, Nebraska, Texas; F. R. Coates—Alabama, Florida, Georgia, Louisiana, Mississippi; L. E. Gould—Illinois, Iowa, Minnesota, North and South Dakota; J. H. Hanna—Delaware, District of Columbia, Maryland, Virginia; P. N. Jones and M. B. Lambert—New Jersey, Pennsylvania, West Virginia; H. H. Norris—Connecticut, Maine, New Hampshire, Rhode Island, Vermont; W. S. Rodger—Michigan; E. M. Walker—Arkansas, Indiana, Kentucky, Tennessee (with L. E. Gould), Wisconsin; E. P. Waller — Massachusetts, New York; E. F. Wickwire—Montana, North and South Carolina, Ohio, Oklahoma, Wyoming.

It is understood that a sub-committee will prepare material for use by the main committee, including a list of advantages of membership with possible later elaboration to form a booklet on this subject. The committee adjourned to meet at Indianapolis, at 2 p.m., Feb. 27.

Recent Happenings in Great Britain

Fares, Wages and Prices All Being Readjusted—£648,000 for Edinburgh Electrification

(FROM OUR REGULAR CORRESPONDENT)

OWING to depression in trade, high wages, high cost of materials, and so forth, the past tramway year in Great Britain has been indeed a dull one. In some respects, however, the corner has been turned. While there is not yet much sign of improved trade, wages and prices have begun to come down. The index figure of the cost of living is steadily falling. Threats of strikes by tramway employees have been met by means of the sliding scale and the only matter still in dispute is the guaranteed forty-eight-hour week.

Fares Reduced from High Levels of War

A few tramway undertakings have already begun to reduce fares from the high levels reached since the end of the war. This is being done in the hope that increased patronage will counterbalance the reduced fares. A few schemes for extensions of track are in prospect, the hope of the promoters being that before the contracts are let prices will have further fallen. No new steam railway electrification work has been put in hand during the year, but a reduction in cost and a possible government guarantee of interest on the new capital may help things forward soon.

Electricity District Proposed to Be Created

The railways owning the main lines running out of London are interested in the proposals of the electricity commissioners to constitute a London & Home Counties Electricity District to be administered and controlled by a joint electricity authority. The scheme has yet to be finally adjusted and confirmed, but the aim here as elsewhere (under the provisions of Electricity Supply Act) is to co-ordinate, consolidate and develop the supply of electricity for all purposes, and to erect great generating stations which will supersede many smaller ones.

The County of London Electric Supply Company has now been authorized to build a station of 100,000 kw. capacity at Barking, and it seems that the railways will not be encouraged to build power stations of their own when they go in for electrification, but to take the energy from a supply company or authority. The railways naturally want to be assured that they will get the power as cheaply as if they produced it themselves. They are to have only one representative on the joint Electricity Authority, which is to consist of twenty-seven members.

The London County Council has approved a report by its highways committee on the question whether a by-law to make it an offence for any vehicle to pass a tramcar on its near side where passengers are entering or alighting would have the effect of reducing the number of street accidents. The committee considered that there would be little doubt that the driving of vehicles between a stationary tramcar and the curb is a source of many accidents and it had for some time attempted to find a remedy.

In April last the Minister of Transport, when approached by the committee stated that it was doubtful whether he possessed the power to sanction such a regulation, and in any case it was unlikely to be considered desirable to do so. In October, a deputation from the Municipal Tramways Association was informed by the Ministry that the matter would be further considered. The highways committee now proposed that the attention of the ministry should be called to the serious increase in the number of accidents at fixed stopping places caused by overtaking traffic and that the ministry should be asked what steps it was proposed to take to safeguard the public.

Wide Powers Enjoyed by Glasgow Corporation

In this connection it is desirable to point out that the Corporation of Glasgow has for some years possessed the power in question, but that many other towns have sought it without success. For some reason or other the municipality of Glasgow succeeded in obtaining powers which are denied to other local authorities. For example, a good many years ago—about the time when electric traction was being generally adopted for Glasgow tramways—the Corporation managed to get an Act passed by Parliament to enable it to fix "rosettes" to the walls of buildings for supporting the span wires whether or not the owners of the agreed. In other towns this substitution of rosettes for big steel poles at the curbs of the footpaths can only be carried out if the owner of the building consents.

In regard to the present case, it appears that under a private Act of Parliament passed some nine or ten years ago, the Glasgow Corporation obtained wide powers to make by-laws. These covered the regulation of street traffic, and one which was put forward provides that when a tramcar is standing at a stopping place every driver of an overtaking vehicle who intends to pass on the near side shall draw up until the roadway is clear of passengers entering or leaving the car. This by-law was in 1915 presented to the Sheriff of Lanarkshire (the local law authority) and he sanctioned it, and soon afterwards it was confirmed by the Secretary for Scotland (who is a member of Government) and thus it became law.

During recent time several English municipalities owning tramways have tried to get Parliamentary powers to the same effect but they were unsuccessful. The Ministry of Transport has set its face against such a regulation as obstructive of general street traffic, and English municipalities evidently have not the general power possessed by Glasgow to enforce such a regulation themselves. On the general question, it may be said that in most if not all towns outside of London, such a regulation might be worked without undue street blocks of traffic and would undoubtedly conduce to the safety of tramway passengers. In London, however, the volume of general vehicular traffic on the main thoroughfares occupied by tramways is so great and the tramcars are so frequent, it seems probable that such a regulation would involve at the stopping places at busy centers a more or less perpetual blockade of general wheeled traffic.

£648,000 for Electrification in Edinburgh

R. S. Pilcher, general manager of Edinburgh Corporation Tramways, has prepared a statement showing the proposed order in which the present cable tramway routes should be electrified. He divides the system into eleven sections and gives successive dates ranging from May, 1922, to September, 1923, at which the work should begin on the several sections. In view of the fact that prices are falling, it is expected that the whole work will cost less than the estimate, £648,000, which is based on present prices. In the end of December the Town Council finally decided to proceed with the electrification on the overhead system.

Abandonments Threatened in English Cities

The local tramway at Taunton some time ago ceased to run the cars because of a dispute with the Town Council over the charge for power. The Council urged the necessity of restoring service on the ground that the present omnibus service was inadequate and unsatisfactory. The Mayor stated that before the cars could be run again, another Provisional Order (the equivalent of an Act of Parliament) would have to be obtained and that it would take at least twelve months to do this.

In Scarborough a threatened cessation of tramway services has been avoided. The Scarborough Tramway decided to stop working at the end of 1921. The traffic is largely seasonal and the tramway, which was placed in service in 1904, has never paid a dividend. An offer from a group of engineers to purchase the undertaking ended the difficulties, however. It is stated that the new company will run omnibuses in conjunction with the tramways.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Des Moines Injunction Unwarranted

State Supreme Court So Holds in Franchise Case, But Orders Trial of Issue on Merits

The Iowa Supreme Court has overruled the decision of Judge James C. Hume in the District Court of Polk County, who granted a temporary injunction restraining the holding of the recent franchise election in Des Moines, Iowa. The members of the Supreme Bench held unanimously that the trial judge in the lower court erred in granting the injunction.

Both sides in the case are claiming a victory in the ruling. The attorneys for the city and for the company feel that the ruling will go a long way in killing the action of the North Des Moines Improvement League when the case is tried on its merits in the lower court. On the other hand, Former Corporation Counsel Byers, who fought the case for the Improvement League, contends that the ruling was only with regard to the holding of the election and that the merits of the case remain to be decided.

The decision of the State Supreme Court was written by Judge Evans. He said:

> Though the ultimate merits have not been ignored by the respective counsel in their arguments here there is no suggestion that such merits be settled by decision at this time.
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> In view of the narrow scope of the question as presented we prefer neither to intimate nor to form any opinion as to final merits of the case. The order granting the temporary writ took the form of a decree and was based upon an expressed finding sustaining the grounds of balance to the validity of the proceedings. Such a finding purported to adjudicate to that extent the final merits of the main case before it had been tried or put at issue.
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> The function of an injunction is not to throw a monkey wrench into the moving machinery of either party except for the purpose of preserving in pending litigation some right which otherwise would be irreparably lost.

The franchise election was held on Nov. 28. On the Saturday preceding, Judge James C. Hume of the District Court, acting upon an injunction proceeding brought by Grant Van Horn of the North Des Moines Improvement League enjoined the holding of the election. The case was put before the Supreme Court informally on Sunday and an order dated Monday was issued by the higher court suspending the operation of the injunction in so far as the holding of the election was concerned. It is thought that the case will not be heard in district court before the latter part of February at the earliest.

A day previous to the overruling of Judge Hume's injunction the Des Moines City Railway filed its formal notice of acceptance of the franchise with the city and posted the $10,000 bond required by the franchise.

There is a general feeling among the citizens of Des Moines that the franchise election is settled and the public seems to be more than satisfied with the quality of service now being furnished by the Des Moines City Railway.

Lively Detroit United Meeting Anticipated

Although threatened with a mandamus action to force action in carrying out the provisions of the ouster ordinance to compel the Detroit United Railway to remove its tracks from Fort Street and Woodward Avenue in Detroit, Mayor Couzens stated that he is not ready to require the company to take its cars off the streets where franchises have expired. He would appear to be holding the ordinance over the head of the company for possible use as a club to force the company to come to terms which more nearly represent the ideas of the city than any so far proposed. Mr. Couzens has purchased one share of the capital stock of the Detroit United Railway and expects to sit as a stockholder at the annual meeting of the company on Feb. 7.

The Mayor's interest in the coming meeting was increased by the announcement by A. Avila Gingras, Montreal broker, that he controlled by proxy a majority of the stock.

The meeting will be an important one since the company must at that time decide whether it will sell its system to the city at a price agreeable to the city officials or tear up its tracks from Fort Street and Woodward Avenue. The city's offer of $388,000 for these tracks, which it is understood still stands, was rejected some time ago by the company. Although the ouster ordinance was passed by a majority in excess of 60 per cent of the voters, no definite steps have been taken by the city to enforce its provisions.

Reports now in circulation are to the effect that efforts are being made to bring about an agreement among all the various factions involved prior to the annual meeting.

In announcing his intentions to bring a mandamus action to compel the Mayor to enforce the ouster ordinance, a local attorney charges that the terms of the ordinance have been evaded and that the fact that the Mayor proposed the ordinance was responsible for his reelection. Other city officials who are charged with responsibility for not enforcing the ordinance are the Corporation Counsel and members of the City Council. The writ, issued by Judge Harry J. Dingeman, orders the city to show cause why the ouster ordinance should not be enforced at once. It is made returnable on Feb. 11.

New Franchise Ready to Be Presented to Dubuque Council

The franchise ordinances over which the officers of the Dubuque (Ia.) Electric Company and the city commissioners have been counseling intermittently for the past several months is understood to be ready to be presented to the Council.

When the franchise renewals for operating street cars and the light and power utility were presented originally last fall, the Council and corporation representatives were unable to agree on some points. The original drafts have been considerably altered, it is said, in the various conferences which have been held.

A special election to secure a vote of the people on the proposed franchises was contemplated when the measures were drawn several months ago. However, this procedure hardly will be followed now, according to O. E. Carr, city manager. The regular municipal election is less than two months away, and the franchises, if approved by the commissioners, probably will be submitted to the voters at that time.

Wage Agreement Renewed, Slightly Modified

A new wage agreement has gone into effect on the United Railways, St. Louis, Mo., Rolla Wells, Receiver, affecting about 5,000 employees, members of the Amalgamated, retroactive to Jan. 1. Motormen and conductors retain the old scale of 50 cents an hour for the first year, 55 for the second, 60 cents for the third, and 65 cents an hour after the third year. Time and a quarter for overtime also remains in effect.

The new contract runs until July 1, and thereafter it may be terminated by either side on thirty days' notice. This arrangement is made by the management in view of the probability of getting a decision from the Missouri Public Service Commission in the valuation case now pending. The present 7-cent fare is to continue in effect until June 30.

The union representatives made a fight for a return to old working conditions under which men on trailer runs were allowed a minimum of eight hours. Under the new agreement the minimum is six hours. The union representatives also contended for time and a half overtime but this was not allowed.

Although the union has ratified the agreement in principle, all of the details have not been worked out and the formal signing of the contract may not take place for several days.

$1,000,000 Fire Damage

Ninety Cars Were Lost by the Chicago Surface Lines in Devon Carhouse on Jan. 26

Fire destroyed half of the Devon Avenue carhouse and seventy-eight passenger cars belonging to the Chicago Surface Lines on Jan. 26. Besides twelve miscellaneous service cars were lost. The intervention of steel rolling shutters between two sections of the carhouse saved ninety other cars and the portion of the building devoted to station headquarters. The loss was about $1,000,000. The building and its contents were covered by insurance.

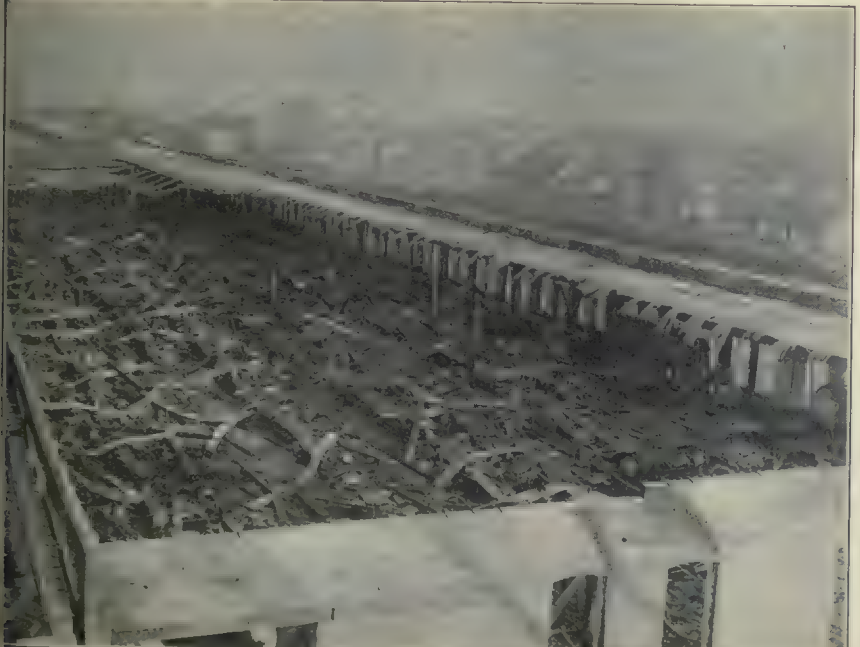
STEEL SHUTTERS WHICH PREVENTED SPREAD OF THE FIRE

The blaze was discovered about 3 o'clock in the morning and within a short time the structure, which was about twenty years old, was a mass of flames. The building was rectangular in construction, about 100 by 1,000 ft., with the principal exit at one end. It was feared that a total loss would result, but the employees succeeded in lowering the rolling doors. This confined the flames to the rear half of the structure. All cars in the rear section were destroyed. The heat was so intense that the metal doors became white hot and some cars on the side of the doors opposite to the fire were scorched by the intense heat of the burning section.

Most of the cars that were destroyed were comparatively new. Some of them, however, were built as long ago as 1908, but some had been constructed as recently as six months ago. The latter included nine of the new trailers. Fourteen re-built motor cars converted to haul trailers were also lost. The miscellaneous equipment destroyed included four sprinklers, three sweepers and two snow plows. The Surface Lines own about 3,200 passenger cars, scattered among sixteen stations. Prompt work on the part of the officials resulted in gathering sufficient of the surplus equipment to the Devon Avenue station so that full service was given in the morning rush hours on the lines affected.

FLAMES CONFINED TO INTERIOR

The roof of the carhouse was of mill-proof, slow burning construction supported by steel girders. This confined the flames to the interior and they spread rapidly from car to car. The electric current was cut off shortly after the fire started. This put out the lights and made it difficult to move the cars, but automobile trucks were secured and a number of cars were taken out the front half of the building before the flames were checked. The debris was cleared away after a few days and it was announced that the burned portion of the carhouse would be used at least temporarily for open storage of cars.


LOOKING SOUTHEAST, SHOWING PART DESTROYED AND REMAINING PORTION OF CARHOUSE AFTER CHICAGO FIRE

Jitneys Defeated in Kenosha

At a referendum election held on Jan. 24 at Kenosha, Wis., the proposition to permit jitneys to operate on the streets of the city was voted down 4,256 to 2,415. Out of nine city wards, the jitneys carried only one. At the same time Kenosha adopted the city manager form of government by a majority of 872.

ROOF GIRDER RESTING AGAINST CAR

The street railway service in Kenosha is being operated by the Wisconsin Gas & Electric Company, a subsidiary of the North American Company. When this company learned that the jitney proposition was to be put to a referendum vote, it at once petitioned the Wisconsin Railroad Commission for permission to abandon railway service in Kenosha should the referendum go in favor of the jitneys.

Some years ago when the jitneys were allowed to operate in Kenosha without any restriction or supervision, the company suspended railway service for forty-five days, with the result that an ordinance was passed regulating jitney operation. Since that time one-man equipment has been introduced in Kenosha. The cash fare there is 7 cents and the ticket fare eight for 50 cents, but an unlimited ride weekly pass is sold for $1.

Shortly before the referendum the company proceeded to inform the public of its attitude on the question, pointing out conditions under which the railway is now being operated and the consequences of permitting unrestricted jitney operation. Newspaper advertising space was freely used by both sides in the campaign.

Kenosha is a city of 40,000 population located about 30 miles from Milwaukee. It is between that city and Chicago.

Governor Miller Favors 5-Cent Fare

Tells Merchants He Thinks It Practicible for New York—Appointed Present Commission

The 5-cent fare in New York will be preserved, in the judgment of Goveror Miller. This statement was made at an address on Jan. 26 to the Merchants' Association. The Governor took occasion also to explain the reasons which led him to appoint the present Transit Commission, and he invited the co-operation of the city government in the work of the commission.

The Governor said he had no word of criticism for the city administration in taking the Transit Commission act to the Court of Appeals in order to test its legality and based his appeal for a cessation of the fight upon the recent decision of that tribunal upholding its constitutionality. He explained he had favored the Transit Commission law because, upon assuming office, he found that the public was getting less service than for years and the problem had become "the football of politics." Continuing, the Governor said, in part:

> If nothing was done I foresaw a situation in this town five years hence, we will say, which to me was appalling, because you know there is a daily increase in travel on the transit lines of this center of 4,000—4,000 more people will ride to-day than did yesterday and 4,000 more will ride to-morrow than did to-day.
>
> Now stop and think what that means—no provision whatever to take care of it. I found it was essential to break the deadlock if we were to get any progress, which for years had existed between the Board of Estimate and the State officials, and, mind you, those officials were all of the same political party.
>
> It was necessary, in my judgment, that the solution of the problem should be vested in a board which possessed the regulatory powers of the State, which have never been delegated to the city. There has been a great deal of talk about the power to modify city contracts. They needed modification in the respect that the companies had advantages under those contracts which they needed to surrender in the public interest. No modification was contemplated requiring the city to give up anything. There was nothing new in anything that was done or in the exercise of any legislative powers that were exercised. Some of the people of this community seem to have forgotten that these very contracts were made in the name of the city by a State body—the Public Service Commission.
>
> Now I take it that the bogey of the 8-cent fare has served its purpose. We still have with us the myth of the 5-cent fare. I say myth, because anybody who rides about this town knows that instead of a 5-cent fare the people are required to pay 7 and 12 and 15 and 17 and even 20 cents for wholly inadequate service. And what you were doing here by clinging to this myth of the 5-cent fare was to make it more likely every month that you would'nt be able to ride at all. What this town needs first of all is service.
>
> And I want to say to you also, in my judgment, the 5-cent fare can be preserved. In my judgment it will be preserved. It will be preserved by establishing a just rule to govern the problem, not on any theory you can get something for nothing—not on the theory that the people will be carried for less than it costs to carry them, including a proper return on the honest capital—and I emphasize "honest"—that is used in their service. You can never extend your transit facilities unless you recognize that principle. If you apply it honestly and impartially all the evidence indicates you can get adequate extensions of transit facilities, and by the elimination of unnecessary waste and cost you can preserve, in all probability, the 5-cent fare.
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> The City of New York is confronted with a situation that its borrowing capacity is now frozen in from $250,000,000 to $300,000,000 of subway bonds, the interest on which and the amortization of which are now being provided by the taxpayers of the city. Unless that frozen credit can be released, the city of New York has not sufficient borrowing capacity to secure needed extensions of your transit facilities or to undertake the vast other public works that are now crying for further expenditure of money. Now, that is the problem. It is in the hands of three gentlemen whom I selected, residents of this community, and I thank God that I was able to find three such public-spirited citizens who were willing to devote their time and talents to the service of this community.
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> Two of them happen to be Democrats and one a Republican. That was merely a coincidence, because I selected these gentlemen wholly regardless of their politics. I looked for the men whom I thought best fitted to solve this problem and I think that every day that goes by the people of this community are learning more and more that a wise selection was made.

Franchise Proposals Popular in Fox River Valley

Franchise proposals are the thing in Aurora and Elgin, Ill., and in other cities in the Fox River valley served by the Aurora, Elgin & Chicago Railroad, and the Elgin & Belvidere Electric Railway. Following the franchise framed by the Elgin City Council, which was discussed in the ELECTRIC RAILWAY JOURNAL for Jan. 14, page 87, B. P. Alschuler, counsel for Joseph K. Choate, receiver for the Aurora, Elgin & Chicago line, presented to Judge Evan A. Evans of the United States District Court, franchises for cities which the line serves. He has prepared one for Aurora, one for Elgin, and one for the other cities in the Fox River Valley which the line taps. Within a few days, Bion J. Arnold, president of the Elgin & Belvidere Electric Railway, submitted a franchise to Mayor Arwin E. Price for consideration by the commissioners.

The first franchise, that of the Aurora, Elgin & Chicago company, provided that the traction company would be liable for no costs of paving, although it will repair streets injured by the company cars. No provisions were made regarding fares, since Attorney Alschuler believes that this does not lie within the province of the cities, but is a matter reserved for the Public Utilities Commission. Under the proposed franchise, the company would have the right to operate over its lines in the city the cars of the interurban companies which feed the city. It would also have the right to use overhead distribution storage battery, and gasoline, kerosene or other materials for motive power. In other respects the franchises correspond to the previous ones in effect.

The franchises are asked in the name of the Aurora, Elgin & Chicago Rail-Electric Company, the name of the reorganized Fox Valley lines.

The franchise presented by Mr. Arnold is for Elgin. It provides for a 5-cent fare during certain hours, a straight 10-cent fare for the casual rider, and a 7-cent fare for the purchaser of twenty-four tickets. Mr. Arnold has planned to run his cars into Elgin over the tracks of the Aurora, Elgin & Chicago Railroad if arrangements can be made.

Storm Worse Than Strike

Unprecedented Snow Fall at Richmond Hampers Company Seeking to Restore Service After Strike

Interest in the railway strike in Richmond, Va., has been almost completely overshadowed by the unprecedented snow storm of Jan. 27 and 28. All traffic was suspended until late Sunday afternoon and on Feb. 1 the streets were still piled high with snow. Steam shovels of the department of publi works cleared some of the principa business streets, but all forms of trave to the suburbs are still much handicapped.

With less than half its normal force of motormen and conductors, the Virginia Railway & Power Company, which had been tied up in Richmond and on its interurban line by a strike, began on the afternoon of Jan. 28 to dig out its main lines. Forces of motormen and conductors in uniform—men hired since the strike began, worked in gangs picking ice from the tracks where vehicle traffic had packed it tight, and by Monday morning a partial service was resumed on the Broad Street and the Main Street lines.

ALL LINES SOON OPEN

General Manager Harvell announced on Feb. 1 that notwithstanding strike and weather conditions, there were seventy-one cars in operation, the average number in normal times exclusive of rush hours being ninety-eight. Five lines remain without service. It may be the end of the week before all of these can be opened as extensive snow drifts are still to be cut in some places. As fast as additional men can be obtained the service will be increased during the rush hours on the principal lines now in operation. Full service has been resumed on the interurban line and in Petersburg.

An agreement has been reached in Norfolk between City Manager Ashburner and President Wheelwright to compromise on a 6-cent fare.

The Richmond Board of Aldermen planned to meet on Feb. 1 to consider concurrence in the action of the Common Council reducing the fare from 6 to 5 cents in Richmond, as a reprisal against the company for its wage cut and refusal to arbitrate.

The company takes the ground that the strike is over, and that but for the storm all lines would now be in normal operation. Experienced men are being employed, and the patronage of the cars now in operation is increasing.

COMPROMISE AGREEMENT EFFECTED

Pending negotiations for a compromise of the strike the Board of Aldermen on the night of Feb. 1 deferred action on the reprisal ordinance reducing car fares from 6 to 5 cents as a penalty to the Virginia Railway & Power Company for its refusal to arbitrate the strike. With the rapid thaw of snow the streets are clearing and service is being restored by the company on nearly all lines.

A conference was set to be held on Feb. 2 to be attended by three representatives of the strikers, three from the company and three from the Board of Aldermen.

NEW WAGE SCALE FIXED

The company has agreed to take back as many men as it needs to fill vacancies, at the rate pay to be 35, 37½ and 40 cents an hour according to seniority, with 5 cents an hour extra for one-man car operation. This is practically the scale against which the men struck and at which the company has since been employing men, the concession being that those who come back at once may retain their seniority and come back as old men and not have to be re-employed as new men at 30 cents an hour. The company has been hiring men of previous experience on other roads on the basis of one year experience. If the negotiations looking toward a settlement of the strike are successful the city is to regulate jitneys, take prompt action on a request for a trolley bus franchise and continue the 6-cent fare for the present.

An agreement has been reached in Norfolk to reduce fares from 7 to 6 cents. The wage arbitration in Norfolk has resulted in a report for a scale of 35 cents an hour for first-year men, 39 cents for second-year men and 42½ cents for third-year men. Service in Norfolk is declared to be normal.

Wireless Comes to Rescue

After all forms of its wire communication had failed the Monongahela Power & Railway Company, Fairmont, W. Va., resorted to wireless to operate its cars and give instructions to its repair crew to mend its breaks occasioned by a recent blizzard. Edward C. Jones, Jr., who, with a couple of companions, operates a wireless set at Fairmont, went to the rescue of the traction officials. He was able to pick up Clarksburg, and immediately upon receipt of this information Capt. L. W. LaMar, manager of the power department of the company, established headquarters in the wireless office and dictated instructions to his superintendents in Clarksburg.

Through the agency of the wireless it was possible for the company to get a 20,000-volt, high-tension feeder working from the Rivesville plant into Parkersburg, supplying sufficient power to bring in the stranded interurban trains caught out on the Clarksburg line when the 66,000-volt feeder went out of commission.

Three-Cent Wage Reduction in Dayton

Wage reductions have been ordered by the Dayton (Ohio) Street Railway which will affect about forty employees. The new scale will be 41, 43, and 45 cents an hour. The old scale was 44, 46, and 47 cents an hour. The People's Railway had previously reduced its wages.

Taxpayers' Suit Heard

Court Takes Under Advisement Plea to Prevent City Dipping Into General Fund to Help Railway

In Superior Court before Judge J. T. Ronald, the "Fourteen Taxpayers" suit, in which taxpayers of Seattle, Wash., are seeking to enjoin the city of Seattle from using general tax funds for the support of the Municipal Railway was recently tried. Judge Ronald took the matter under advisement.

In the opening testimony, attorneys for the taxpayers outlined past fiscal policies of the corporate authorities with respect to the Municipal Street railway, which indicate danger of invasion of the general tax fund to pay for the maintenance and operation of the traction system in the future. Specific instances were quoted.

The position taken by the fourteen taxpayers in seeking a permanent injunction against the invasion of the general fund for the railway was briefly outlined by counsel for the plaintiffs. In presenting the case counsel said:

> We expect to prove that at the time of the bringing of this action last February the city had taken $83,000 from the general fund for the railway. We contend that this money was illegally taken from the general fund, and that this is sufficient justification for our suit. Also, on account of lack of money to meet the interest on the bonds, warrants were issued while the railway was on a warrant basis, amounting to many thousands of dollars.
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> During 1918 and 1919 the revenues were not nearly enough to pay for the operation and maintenance of the utility, and the same thing was true as to the year 1920. At the time our action was brought, this was only estimated as to 1921, but we can now show the standing of the railway up to 1921.

Attorneys for the taxpayers also submitted testimony in the form of a report prepared last January for Mayor Hugh M. Caldwell, showing departmental expenditures of approximately $1,250,000 from general tax funds for the benefit of the Municipal Railway during the years 1919 and 1920, and an estimated expenditure of approximately $720,000 from the same source for the year 1921, a total of almost $2,000,000.

Attorney Donworth, for the city, stated that the general fund is not in imminent danger of invasion for the railway, and that the traction system shows every prospect of standing on its own feet on the present 8½-cent fare, and of paying its obligations of principal and interest and maintenance and operation without resorting to taxation for support.

In the suit of the Puget Sound Power & Light Company to compel "specific performance" by the city of Seattle under the contract by which the city bought the company's railway system, Federal Judge E. E. Cushman on Dec. 19 handed down a memorandum decision ordering the plaintiff's form of decree entered as the ruling of the court. The form of decree was in part as follows:

> If the gross of revenues received are sufficient to pay the charges expressly provided in the bonds to be superior to the bonds, but are not sufficient to also pay the bonds with interest by or on March 1, 1939, payable in the manner and at the times herein before decreed, and the cost of maintenance and operation, then the city shall pay such cost of maintenance and operation out of its general fund or any fund available and cannot legally and permanently divert such gross revenues from such special fund created for the payment of the principal and interest of such bonds to the payment of cost of operation and maintenance.
>
> The city shall, out of its general fund or from some other available source, other than the gross revenue of the system, pay the cost of operation and maintenance, when not doing so will cause operation of the system or some part thereof to cease or deprive the owner of any bond issued under Ordinance 39025, of any part of the gross revenues of the sysem pledged to the special fund for the payment of the principal and interest of such bonds as herein decreed.

The decision was based largely on the opinion of the State Supreme Court, in the case of Twichell against the city of Seattle, the "friendly" suit in which the validity of the railway purchase was involved.

In ruling on the Puget Sound Power & Light Company's alleged prior claim to the gross revenues of the railway, Judge Cushman in his decision said:

> The question of complainant's claim on the gross current income for the payment of the installments of principal and interest, next falling due, is not only indirectly involved because of the necessity of its consideration in order to determine the question of default upon failing to pay into the special fund, thirty days prior to the due date; but it would appear to be directly put in issue by any refusal of the city to disclaim, confess or deny the priority of complainant's right to such gross revenue and fund. Complainant, by its bill, asserts its priority of right to the gross revenue and, in effect, pleads that, by the decision in the Twichell case it was determined that to preserve complainant's priority right in the gross revenue, the city would, if such revenue were "insufficient to meet all charges, be compelled to pay the cost of maintenance and operation by taxation or from other sources than the revenue of the property."

New Subsidiary Organized by New Jersey Corporation

The Public Service Production Company has been incorporated in the interest of the Public Service Corporation of New Jersey. It is explained that the purpose of the Public Service Corporation is to broaden its field of usefulness. The new company will be an engineering organization. It will be separate from the operating companies, confining the work of the latter to operating, pure and simple. The new company will be prepared to undertake engineering and construction work for governmental agencies, public utilities and corporations generally.

Thomas H. McCarter, president of the Public Service Corporation, said:

> There is a very large field for electric engineering and development throughout the country, a part of which the new company hopes to fill. It will also be prepared to do valuation work for public utility and industrial corporations. It also proposes to embark in the paving business upon a substantial scale. The United States Government, the various states and municipal divisions thereof, are spending and propose to spend vast amounts of money in paving, and we are of the opinion that there is room in the business for a substantial corporation which will do first-class work at fair prices.

The charter is extremely broad with respect to the activities in which the new company may engage. The papers of incorporation show that $5,000,000 of preferred stock will be issued, paying 8 per cent cumulative dividends. There will also be issued 50,000 shares of common stock of no par value.

Financial and Corporate

$290,000,000 P. R. T. Value at 1919 Prices

The total valuation of the property of the Philadelphia (Pa.) Rapid Transit Company, as stated by that company, is $290,000,000. That was developed on Jan. 26 at the hearing in the valuation proceedings before Public Service Commissioner Clement when W. K. Myers, of the company's valuation committee testified that the going concern value was $38,000,000.

Mr. Myers in his testimony defined going-concern value as the value that exists in a complete, matured and successfully operated property with a built-up business attached as compared with a new property which is in that immure condition usually prevalent at the beginning of its operation. It includes the added value to a property usually attendant upon the consolidation of many plants into one efficient organization, the benefit of which should be reduced cost of operation and improved service He said that it also includes the added value to a property because of the development of the physical property, the management and business.

The witness explained that the $38,000,000 amounts to approximately 15 per cent of the reproductive cost as of June 30, 1919. He maintained that his estimate should be added to any base figure which the commission may decide upon as being the proper reproductive cost to use in the determining fair value.

Indiana Property for Sale

Sale of the property of the Lafayette (Ind) Service Company has been ordered in a decree issued by Judge A. B. Anderson in United States Court. The decision was reached at a hearing in the foreclosure suit filed against the company by the Real Estate Trust Company, Philadelphia, representing the holders of $225,000 of bonds. Judge Anderson directed that the decree of sale provide for disposal of the company's property in such a manner as to bring the largest return. The property is to be sold within forty days of the decree and will be offered first as a unit and if not sold then in parcels. The plaintiff will ask Charles Martindale, master in chancery, to set Feb. 18 as the date for the public sale.

One of the bidders for part of the property will be the Northern Indiana Gas & Electric Company, according to W. A. McInery, of South Bend, Ind., counsel for the company. Mr. McInery said his company wished to buy the electric railway's power plant in order to supplement the electric service now given to the city of Lafavette by the Northern Indiana Gas & Electric Company. Mr. McInery indicated that his company would buy the company's property as a unit, if necessary, but that it had no desire to operate the railway system. He said in such an event his company would endeavor to interest Lafayette capital in the development of the electric railway service.

He said that the company was not making any money as now operated by a receiver and that it was thrown into the hands of the receiver largely as a result of competition from jitneys. He said, furthermore, that capital sufficient to operate the system could not be interested in the venture so long as the jitneys were permitted to run without regulation.

Interest Charges in Seattle Will Be Decreased Considerably in 1922

Interest charges on the $15,000,000 bonds issued to Stone & Webster in payment for the Seattle (Wash.) Municipal Street Railway will be decreased in the fiscal year 1922 by $41,650, bringing the annual payment of interest on these securities down to $708,350. This will result from the payment on March 1 of the first $833,000 annual instalment of the principal of the $15,000,000 debt. The annual interest charge for 1921 was $750,000.

Figures prepared by City Comptroller H. W. Carroll show that in 1921 the accumulated deficit of the electric railway was reduced by approximately $160,000. The net profit for the eleven months ending Nov. 30 was $130,588. The profit for December has not yet been figured, but as it was a prosperous month for the railway, the accountants estimate the gain of revenues over operating costs during the last thirty-one days of 1921 at about $30,000, making the year's total profit about $160,000.

This means, the accountants point out, that the railway not only did not incur any further deficit during the year, but instead reduced the deficit which was on the books at the beginning of the period. During 1920, there was no profit, but a loss of $1,236,239. The total deficit at the beginning of 1921 was $1,184,163. Of this $1,177,696 was a charge for depreciation of the system, or the amount which should have been set aside or else expended in betterments and replacements to keep its values the same as when it was appraised in 1918 at $15,000,000.

The accountants pointed out that if this depreciation charge were ignored, the railway would have had a surplus of $118,031 in its treasury on Nov. 30, 1921, when the depreciation charge had increased to $1,801,607. In 1921, with a profit of approximately $160,000, the deficit was cut from $1,814,163 to approximately $1,653,576.

Petition for Appointment of Receiver Withdrawn

Clarence H. Venner, who as president of the General Investment Company and the Continental Securities Company, brought suit in equity on Aug. 27 in the Federal District Court at New York to place the Interborough Rapid Transit Company in receivership, withdrew the application when the hearing on the petition was resumed on Jan. 3, before Judge Julius M. Mayer of the United States Circuit Court of Appeals. Venner, through his attorney Elijah Coline, said that he withdrew the action in view of his belief that the situation has changed since institution of the proceedings.

The petitioners claimed when the suit was instituted they actually believed that a great crisis existed in connection with the financial affairs of Interborough Rapid Transit and did not believe that it would be possible to obtain an extension from the holders of the defaulted bonds.

The petitioners held, however, that despite belief that the crisis had passed great danger still remains and they asked the court for permission to file an interrogatory which would permit renewal of the application if the situation demanded.

James L. Quackenbush, attorney for the Interborough, in explaining the situation said he desired to have it understood that the petition was voluntarily withdrawn by the plaintiff and not on the request of the company. He added that although the petitioners' attitude in the proceedings was most gratifying he would not consent to withdraw motions made at previous hearings on behalf of the Interborough to dismiss the application in view of the plaintiff proposing to file an interrogatory.

San Francisco Committee to Take Up Market Street Railway Purchase

The public utility committee of the Board of Supervisors of San Francisco, Cal., on Jan. 18 appointed a committee to negotiate with the Market Street Railway as to the proposed purchase of the properties and the plan of submitting a proposition to the voters of San Francisco.

The committee is composed of Mayor James Rolph, City Engineer M. M. O'Shaughnessy, City Attorney George Lull and five members of the Board of Supervisors.

Three points are to come up for consideration in the preliminary conferences. These are (1) whether the company will sell on the "pay-as-you-go" basis, which was provided for in a charter amendment relating to the purchase of public utilities by the city and passed by the voters on Nov. 2, 1920; the idea being that the utility would be paid for out of its own earnings, (2) at what price the company will sell and (3) whether San Francisco would have to guarantee certain sums in annual payment.

$1,117,621 Profit in Boston

From an Accumulated Operating Deficit of $5,000,000 in 1919 Road Has Been Established on Self-Supporting Basis Under Public Trustees

After making allowance for delayed charges and credits applying to the operations of previous years the receipts of the Boston (Mass.) Elevated Railway for the calendar year ended Dec. 31, 1921, exceeded the cost of service by $1,117,621. In the preceding calendar year the cost of service had exceeded receipts by $346,951. On Dec. 31, 1920, there were also outstanding deficits carried over from the year 1919 that amounted to $459,007. These obligations totaling $805,959 have been met and $311,661 paid into the reserve fund as required by law.

THESE facts together with other details of operation for the year just ended are contained in the third annual report of the board of trustees of the company made to the Massachusetts Senate and House pursuant to the Special Act of 1919.

Three years and a half have elapsed since the trustees took charge. At the end of the first year during which a 5, then a 7 and finally an 8-cent fare was in force an operating deficit of approximately $5,000,000 had accumulated which was met from the reserve fund and general taxation in the cities and towns served by the railway. In the second year with a flat 10-cent fare in force revenue practically met expenses. In the calendar year just closed, as already stated, receipts exceeded expenditures by approximately $1,117,000.

TRAFFIC STATISTICS OF BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31.

	1921	1920	1919
Round trips operated	5,778,881	5,770,692	6,588,226
Passenger revenue	$32,253,629 59	$33,108,946.48	$28,767,544.11
Passenger revenue per car-mile; cents	64 89	64 62	53.74
Passenger revenue per car-hour	$7 361	$7 155	$6.057
Passenger revenue mileage	49,706,697	51,237,527	53,533,522
Passenger revenue car-hours	4,381,815	4,627,295	4,749,318
Revenue passengers carried	337,252,080	335,526,561	324,756,635
Revenue passengers carried per car-mile	6 785	6 548	6 066
Revenue passengers carried per car-hour	76.97	72.51	68.36

INCREASE IN PASSENGER TRAFFIC DESPITE DEPRESSION

Notwithstanding the general lessening of traffic upon railroads and railways which began with the industrial depression last spring on the Boston Elevated there has been an increase in number of passengers carried. The public trustees in charge of the affairs of the company attribute this as due in large measure to the experimental operation of 5-cent surface lines for short distance travel without transfer. The number of passengers now riding for a 5-cent fare is 18 per cent of the total riding. With the establishment of additional lines to be in operation within this and next month the number will undoubtedly exceed 20 per cent of the total riding. This limited local service adds to the usefulness of the railway without imposing material burden upon those who pay the basic 10-cent fare. The trustees say that this experiment with this service has attracted the attention of transportation experts in many large cities and that "it may well lead to the adoption of some plan for a general reduction in fares upon an equitable distribution of the charge for riding."

The operating costs of 1921 reflect lower prices of coal and materials, decrease in wages, the less severe conditions of the winter season and changes that have promoted efficient operation. The division of expenditures is graphically shown in the accompanying chart.

The power plant has been improved through installation of new equipment such as air compressors, soot blowers, reactance coils, air washers, feed pumps and rotary converters. Fewer tons of coal have been burned during the last year than in any of the years given in the accompanying comparative table showing the price of coal per ton and the unit of efficiency of the coal that was burned:

COMPARATIVE PASSENGER STATISTICS
REVENUE PASSENGERS CARRIED

Year	Week-Day Average	Saturday Average	Sunday Average	Holiday Average	Total for year
1915	992,283	1,140,046	685,726	846,860	352,469,586
1916	1,050,038	1,218,749	718,804	832,962	373,577,908
1917	1,073,943	1,249,588	728,847	857,902	381,017,338
1918	985,384	1,147,809	658,902	775,634	348,664,700
1919	934,918	1,078,635	596,182	706,429	324,758,685
1920	960,737	1,072,319	591,063	703,634	335,526,361
1921	975,745	1,068,295	578,860	696,691	337,352,080

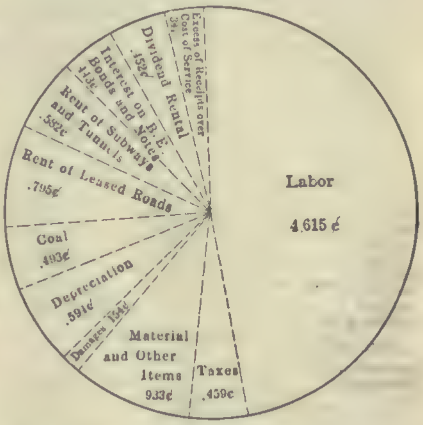
COAL COSTS OF BOSTON ELEVATED RAILWAY.

	1921	1920	1919	1918	1917	1916	1915
Tons of coal burned	215,870	258,087	287,670	281,677	270,452	254,735	244,912
Pounds of coal per kilowatt-hour	2.174	2.353	2.835	2.772	2.309	2.256	2.321
Average price of coal per ton	$7,71	$10.07	$5.91	$6.26	$4.19	$3.35	$3.39
Net cost of power for car service per kilowatt-hour, cents	1.172	1.921	1.307	1.158	.620	.534	.517
Net cost of power per total revenue car-mile, cents	4.815	8.538	5.439	4.668	2.573	2.137	1.972

During the year 27.242 miles of track were constructed and 13.88 miles improved by extensive repairs. One hundred and five modern center entrance cars were received and placed in service and forty-six of the sixty-five steel cars ordered to replace an equivalent number of wooden cars in use on elevated lines were received. Several large snow ploughs have been added to the equipment. The list of useless equipment has been lessened by the disposal of obsolete cars, snow ploughs, trucks and other miscellaneous equipment.

The terminal yard at Forest Hills has been completed and the operation of trains from this yard began on Nov. 9. The trustees explain that this means efficient operation of the main line, reduces the likelihood of serious results should the Charlestown Bridge become disabled and annually lessens operating costs by eliminating nearly 1,000,000 miles of dead mileage.

12 Months Ending December 31, 1921
Average Receipts per Revenue Passenger
9.867¢



ALLOCATION OF RECEIPTS PER PASSENGER

IMPORTANT RAPID TRANSIT PROJECTS PENDING

Two exceedingly important and far reaching changes in rapid transit are now pending. One involves virtually a new transit thoroughfare for the operation of three-car trains from a terminal at Braves' Field, Allston, through the Boylston and Tremont Subways and over the East Cambridge Viaduct to Lechmere Square, Cambridge, where a new terminal is being constructed. This change will substitute one large unit for several small units and through the use of trains with additional cars will mean more frequent, rapid and regular service that will materially relieve the congestion in the subway. The other change is that proposed in the lines operating on Huntington Avenue through the substitution of train for single car service. According to the trustees these two improvements furnish the only known way of relieving the congestion in the Tremont Street Subway until a permanent remedy is

BOSTON ELEVATED RAILWAY
INCOME STATEMENT

OPERATING INCOME	12 mos. ending Dec. 31, 1921	12 mos. ending Dec. 31, 1920	12 mos. ending Dec. 31, 1919
Passenger revenue	$32,237,396.47	$33,096,763.69	$28,752,675.38
Special car revenue	16,233.12	12,182.79	14,868.73
Mail revenue	578.98	737.10	722.24
Express revenue	44,154.94	88,657.99	89,002.98
Miscellaneous transportation revenue	3,838.20	4,383.17	3,001.85
Total revenue from transportation	$32,302,201.71	$33,202,724.74	$28,860,271.18
Station and car privileges	$305,937.96	$300,228.32	$293,871.62
Rent of tracks and facilities	26,051.00	39,059.11	41,477.2
Rent of equipment	1,659.83	1,644.27	5,209.40
Rent of buildings and other property	111,951.20	100,499.45	82,514.36
Power	84,932.67	92,192.00	46,349.33
Miscellaneous	20,318.76	14,514.61	74,898.45
Total revenue from other railway operations	$550,851.42	$548,137.76	$544,320.41
Total railway operating revenues	$32,853,053.13	$33,750,862.50	$29,404,591.59
Railway operating expenses:			
Way and structures	$3,021,844.18	$3,226,275.11	$3,783,715.35
Equipment	4,470,357.23	4,033,850.42	4,290,039.81
Power	2,532,500.73	4,568,991.90	2,980,658.59
Conducting transportation	10,752,382.64	11,524,823.18	10,530,882.29
Traffic	2,401.23	3,357.91	4,758.03
General and miscellaneous	2,063,570.98	2,411,823.59	2,110,285.34
Total railway operating expenses	$22,843,056.99	$25,769,122.11	$23,700,339.41
Per cent. of operating expenses to operating revenues	69.53	76.35	80.60
Per cent. of operating expenses to operating and non-operating income	68.65	75.72	80.34
Net revenue, railway operations	$10,009,996.14	$7,981,740.39	$5,704,252.18
Taxes assignable to railway operations	1,546,758.15	1,142,987.28	1,045,502.37
Operating income	8,463,237.99	6,838,753.11	4,658,749.82
NON-OPERATING INCOME			
Income from lease of road	$823.40	$823.40	$823.40
Dividend income	9,180.00	9,180.00	9,180.00
Income from funded securities	4,503.41	6,356.89	6,280.50
Income from unfunded securities and accounts	375,158.65	233,379.60	42,853.06
Income from sinking fund and other reserves	33,280.00	28,853.33	33,280.00
Miscellaneous income	1,026.94	2,180.72	1,565.27
Total Non-operating income	$423,972.40	$280,773	$94,991.23
Gross income	$8,887,210.39	$7,119,527	$4,752,741.05
DEDUCTIONS FROM GROSS INCOME			
Rent for leased roads:			
West End Street Railway	$2,630,780.24	$2,590,258.15	$2,540,892.94
West End Street Railway—Tremont Subway	182,512.32	177,686.09	176,545.11
Other roads	48,914.48	48,303.71	57,793.99
Total rent for leased roads	$2,862,207.04	$2,816,247.95	$2,775,232.04
Miscellaneous rents	$1,781,225.46	$1,612,746.21	$1,339,501.90
Net loss on miscellaneous physical property	6,959.96	9,325.77	7,986.10
Interest on funded debt	1,292,800.00	1,307,018.75	1,309,477.08
Interest on unfunded debt	201,458.43	207,945.23	246,312.98
Amortization of discount on funded debt	31,468.08	34,860.38	44,290.46
Miscellaneous debits	16,279.55	14,881.50	8,070.37
Total deductions from gross income	$6,192,398.52	$6,003,025.79	$5,730,870.93
Net income transferred to credit of profit and loss	$2,694,811.87	1,116,501.26	*978,129.88*
Proportion of dividends	1,523,367.00	1,463,668.50	1,403,970.00
Balance after cost of service	$1,171,444.87	*$347,167.24*	*$2,382,099.88*

Note—Figures in italics indicate deficits.

BOSTON ELEVATED RAILWAY
OPERATING EXPENSE ACCOUNTS

WAY AND STRUCTURES	1921	1920	1919
Superintendence of way and structure	211,850.11	194,428.55	189,806.92
Maintenance track and roadway (except snow and ice)	1,724,134.42	1,162,612.96	2,784,370.28
Removal of snow and ice	63,460.07	615,548.70	18,549.67
Roadway structures	96,630.14	79,253.48	78,838.28
Signal and Telegraph and Telephone lines	23,370.33	45,728.82	40,125.98
Other miscellaneous way expenses	14,012.13	19,163.99	80,608.36
Maintenance for electric line equipment	278,348.00	264,490.05	251,258.31
Maintenance of buildings, fixtures and grounds	335,038.98	348,048.56	296,957.55
Depreciation of way and structures	275,000.00	17,000.00	43,200.00
Total way and structures	$3,021,844.18	$3,226,275.11	$3,783,715.35
EQUIPMENT			
Superintendence of equipment	142,844.54	136,169.08	130,546.65
Maintenance of cars	1,640,767.49	1,699,568.11	1,550,450.88
Maintenance of electric equipment of cars	628,477.20	804,309.30	593,667.37
Shop expenses	275,822.05	326,959.57	272,509.31
Miscellaneous equipment, vehicles, horses, etc.	53,445.95	44,844.36	38,545.60
Depreciation of equipment	1,729,000.00	1,022,000.00	1,704,320.00
Total equipment	$4,470,357.23	$4,033,850.42	$4,290,039.81
POWER			
Superintendence of power	79,834.66	85,059.57	78,597.01
Maintenance of power plants	337,746.70	457.635.12	328,835.05
Depreciation of power plant buildings and equipment	....	965,000.00	256,480.00
Operation of power plants	2,114,919.37	3,061,297.21	2,316,746.53
Total power	$2,532,500.73	$4,568,991.90	$2,980,658.59
CONDUCTING TRANSPORTATION			
Superintendence of transportation	990,478.82	1,008,465.02	870,231.52
Passenger conductors, motormen and trainmen	7,041,863.84	7,646,971.90	6,858,788.30
Freight conductors, motormen and trainmen	12,150.78	15,715.67	20,450.89
Miscellaneous car service employees	311,922.91	296,455.06	267,635.58
Miscellaneous car service expenses	155,427.67	206,948.02	236,186.71
Station employees	720,736.44	735,178.90	819,994.25
Station expenses	183,938.93	219,632.87	199,113.10
Carhouse employees	873,312.15	920,926.65	859,285.35
Carhouse expenses	59,941.20	75,141.23	75,298.44
Operation of signal and telegraph and telephone lines	221,537.17	214,559.69	168,891.80
Other transportation expenses	181,072.73	184,828.17	155,006.35
Total conducting transportation	$10,752,382.64	$11,524,823.18	$10,530,882.29
Traffic	2,401.23	3,357.91	4,758.03
GENERAL AND MISCELLANEOUS			
Salaries and expenses of general officers and clerks	412,724.08	408,825.79	389,588.64
General office supplies and expenses	81,760.91	198,992.05	78,026.75
Law expenses	62,180.47	35,941.44	20,142.84
Relief department expenses, pensions and graituities	60,291.17	43,837.44	34,743.75
Miscellaneous general expenses	75,270.56	75,865.97	68,941.20
Injuries and damages	665,798.02	785,971.56	830,663.98
Insurance	287,406.21	372,849.38	274,052.74
Stationery and printing	92,120.81	108,569.70	82,991.60
Store, garage and stable expenses	286,504.07	350,969.92	294,184.04
Rent of tracks and facilities	24,212.73	13,998.99	13,789.55
Rent of equipment	15,301.95	16,001.35	23,160.25
Total general and miscellaneous	$2,063,579.98	$2,411,823.59	$2,110,285.34
Total operating expenses	$22,843,056.99	$25,769,122.11	$23,700,339.41

provided through the enlargement of the facilities which this subway affords. In conclusion the trustees say:

> In the return to a better financial footing with assurance of ability to procure sufficient revenue to meet the costs of service the trustees welcome the opportunity to deal more liberally with questions of accommodation for the public and less attention to drastic measures aimed merely at economies. It is now possible without abandonment of business methods or disregard of economies that make for efficient service to decide upon the merits, requests involving additional usefulness and larger convenience for the car riding public.
>
> Recommendations for legislation have been duly filed in accordance with law and now appear as Public Document House No. 68. One of them relates to the issue of bonds to provide capital for the completion of repair shops at Everett. The shops now in use are the inheritance of horse car days, wholly unfit to meet every day needs in painting, repairing and caring for rolling stock. The annual saving that would follow the use of the shops which have been planned would be very large.

Utility Commissioners Concerned Over Depreciation Case

Opposition to transfer of jurisdiction over rates of depreciation of the Washington Railway & Electric Company from the District of Columbia Public Utilities Commission to the Interstate Commerce Commission is made by the National Association of Railway & Utility Commissioners.

The association, according to its general solicitor, John E. Benton, desires to make the issue a test case. It claims that if jurisdiction over rates of depreciation of the local electric railway is transferred from the District Utilities Commission to the Interstate Commerce Commission, it might lead to the taking from all state utilities commissions the power to fix rates of depreciation for street railways and transfer it to the Interstate Commerce Commission.

Seattle Withholding From Peter to Pay Paul

Accumulation of the $1,240,000 fund to meet the various items of indebtedness of the Seattle (Wash.) Municipal Street Railway falling due between now and March 1, has been completed, with a surplus of approximately $4,000.

To accumulate the fund, the railway has been on a warrant basis since Dec. 24, and warrants of the railway are now outstanding in the sum of $599,581 bearing interest at 6 per cent, and honored by local banks. City Treasurer Collier stated that the city would probably redeem the warrants on Feb. 1.

Lower Fares, but Not Increased Patronage

Cincinnati electric cars carried 320,000 fewer passengers in December, 1921, than in the month of December 1920, despite the fact that the rate of fare was a full cent less per ride. This is shown in the financial statement of the Cincinnati (Ohio) Traction Company received by William Jerome Kuertz, Street Railway Commissioner.

The actual number of revenue passengers at a 7½-cent fare in December was 9,216,583 in the preceding December 9,535,949 revenue passengers were carried at an 8½-cent fare. In actual earnings the railway received $100,180 less in December, 1921, than in the preceding December. Yet the month showed a surplus of $23,153—just offsetting the November deficit—while in December, 1920, there was a deficit of $64,157.

The deficit was due to both higher operating expenses and the fact that the company was then paying the city franchise tax. Earnings for December, 1921, totalled $723,004 and expenditures $699,851. The figures for December, 1920, were: Earnings, $823,184; expenditures, $887,340.

$620,046 Surplus in Baltimore

According to figures made public on Jan. 26 by President C. D. Emmons of the United Railways & Electric Company, Baltimore, Md., there were 15,843,199 fewer passengers carried last year than in the year before, and 5,799,986 fewer than were carried in 1919. The total number carried last year was 238,090,980, which represents a loss of 6.24 per cent as compared with the previous year, but that year the increase in this traffic was 4.12 per cent over 1919.

While fewer passengers were carried, the car miles on the company's lines last year totaled 35,708,000, as against 35,522,000 in 1919. With this loss in traffic the company was able to come through the year with a surplus after all expenses and fixed charges of $620,046, as compared with $1,045,650 in 1920.

This surplus was about $280,000 less than has been estimated as necessary by the Public Service Commission and about $780,000 less than the commission has estimated should be earned to keep the company's property and service at the best standard, but even this $620,046 was made possible only by the strictest economies even with a 7-cent fare.

Many of the economies were not forced upon the management until about the middle of the year, when it became apparent that the expected improvement in conditions was not to mamaterialize soon.

Total revenues from all sources last year were $16,325,066, a decrease of $988,532; operating expenses were $9,940,861, a decrease of $465,722; depreciation was put at $816,253, a decrease of $49,246, leaving net operating revenue of $5,567,951, a decrease of $473,383. Taxes amounted to $1,736,700, a decrease of $28,713, and fixed charges to $3,310,437, an increase of $17,111. Non-operating income of $99,233 added to the gross income left the net surplus as stated.

December traffic was greater than that of any previous month since July, which is unusual and indicates that further improvement may be expected after the present slack season is over.

$529,237 Balance in Washington in 1921

The financial condition of the Washington Railway & Electric Company, Washington, D. C., and its subsidiaries showed substantial improvement during 1921. According to the report of William F. Ham, president, submitted to the annual meeting of stockholders on Jan. 21 the earnings, subject to revision on final audit, were:

Gross earnings from operations, $5,455,623; miscellaneous income, including dividends from the Potomac Electric Power Company, $654,511. Gross income, $6,110,135. Operating expense, including depreciation, taxes and miscellaneous charges, $4,382,937; interest on funded and unfunded debt, $772,960; payment of 5 per cent dividend on preferred stock, $425,000. Total, $5,580,897. Deducting this from gross income leaves balance for the year 1921 credited to profit and loss of $529,237.

In discussing this Mr. Ham said:

> From the foregoing statement it will be seen that the company has made material progress as compared with recent years. With the exception of dividends from the Potomac Electric Power Company, no income was received by the Washington Railway & Electric Company on its investments in stock of subsidiary companies. It is, however, gratifying that the subsidiary railway companies show an operating profit to the parent company (without any allowance for return upon investment) of $30,005, as compared with an operating loss of $190,798 in 1919.

There was a noticable increase in the efficiency of employees in each and every department. This is well illustrated by the reduced turnover in labor, as evidenced by the number of new trainmen employed. During 1921 only 285 new trainmen were put into the service, compared with 667 in 1920, and 1,270 in 1919.

The expenditures and allowances for maintenance and depreciation of track and roadway again reached large proportions, the total for the year being $1,081,615.

During the first eight months of the year the rate of fare within the District of Columbia was 8 cents cash or tickets at the rate of four for 30 cents, during which period the average fare was 7.53 cents per pay passenger. By order of the Public Utilities Commission of the District of Columbia, effective Sept. 1, 1921, the rate of fare was reduced to 8 cents cash or tickets at the rate of five for 35 cents, such rate to continue in force until March 1, 1922. This reduced the average fare during the last four months of the year to 7.06 cents per pay passenger.

Financial News Notes

Right Sought to Issue $2,272,000 Bonds.—The Illinois Traction System, Peoria, Ill., has asked the Illinois Commerce Commission for permission to issue $2,272,000 first refunding bonds, to bear 5 per cent interest and maturing on Dec. 1, 1939.

No Bidders for Bonds.—No bids were received by City Comptroller Harry W. Carroll on the proposed $680,000 issue of street railway utility bonds, with the proceeds of which the City Council of Seattle planned to finance the retracking of First Avenue. The fact that there are already several bond issues, including the $15,000,000 railway bonds which would be superior liens against the system, was given by officials as an explanation for the absense of bidders. The bonds were publicly advertised.

Expenditures Approved for Terminal Entrance.— Judge John M. Killits in Federal Court at Toledo, Ohio, has granted to B. J. Jones, receiver for the Ohio Electric Railway, an order permittng him to buy a share of stock in the Toledo Interurban Station Company for $100, make a deposit of $500 with that company and expend about $4,000 to make necessary track connections to enter the downtown district over the tracks of the Community Traction Company. Mr. Jones was also authorized to pay a power bill of $3,121 made with the Toledo Edison Company for electric current delivered to Lima and points along the Ohio Electric Railway between Toledo and Lima.

Dividends Ahead for Eastern Massachusetts Issues. — The Boston *News Bureau* says that the capital readjustment plan of the Eastern Massachusetts Street Railway trustees having been declared operative, it is expected inauguration of dividends on first preferred stock will follow in due course. Present authorized amount of first preferred is $1,027,700 and assuming that the entire $3,239,000 sinking fund stock is exchanged for first preferred under the plan, the maximum possible amount outstanding will be $4,266,700. To pay dividends on this issue will require surplus earnings of a little more than $250,000 per annum. For the 1921 calendar year the Eastern Massachusetts earned more than the full cost of service as permitted under the special act, viz., $2,400,000. Bond interest and rentals of leased lines amount to $1,600,000 a year, indicating a leeway of $800,000. In fact, the road is earning so much more than would be necessary for paying full dividends on first preferred as to suggest that preferred B stock also is steadily wheeling into line for dividend consideration.

Traffic and Transportation

Preliminary Report Submitted

Engineer Vanneman Sees Flaws in System—City Partially to Blame for Interference With Service

Charles R. Vanneman, chief engineer of the New York Public Service Commission, has submitted a preliminary report on the service provided by the United Traction Company, Albany, N. Y. An investigation had been requested of the commission by P. L. Merriman, a lawyer of Albany, who charged the traction company with giving inadequate service.

Mr. Vanneman said that his observations of travel on Jan. 5 and 6 led him to make certain suggestions to the United officials on improvement of service. Checks made on these observations on Jan. 18 and 19 showed that the improvements had been effected, but that twenty-one additional trips should be provided during the evening rush hours. To relieve this rush-hour condition extra conductors board the cars carrying standing loads on Pine Hills, Delaware Avenue and West Albany line to expedite the loading and unloading. Employees have been stationed at various places to sell tokens and to assist in the rear door alighting. At the suggestion of the investigators additional employees were stationed at State and Pearl Streets to speed up the loading and the unloading.

To what extent the operation of the one-man car is instrumental in causing poor service was explained in detail by Mr. Vanneman in this report. After studying this operation of the past two months Mr. Vanneman gives seven factors involved in the one-man congestion which is apparent since the termination of the strike. They are as follows:

1. Unfamiliarity of a large number of new employees with the new cars, as well as the routes.
2. Unfamiliarity of old men taken back with one-man operation.
3. Unfamiliarity of the public with one-man operation, and an apparent unwillingness to move to the rear of the car.
4. Inadequate supervision by the officials, especially during the rush hours.
5. Interference of vehicular traffic, especially on North Pearl Street.
6. Since the snow has come, interference of vehicles, both wilful and unavoidable.
7. Increased time required in loading and unloading by one-man cars.

In making suggestions for the lessening of the congestion Mr. Vanneman suggests that the company acquaint its employees thoroughly with the one-man car apparatus and now and then examine all operators to see that they are thoroughly familiar with the various devices used. He further believes that an extensive publicity campaign should be waged by the traction company informing the public of the need for "passing to the rear of the car."

As to the fourth cause, namely, inadequate supervision, Mr. Vanneman emphasizes the need for prompt dispatching which should begin with the supervising force and be passed on to the operators whose co-operation is absolutely necessary.

The report stresses as a great interference with service by the United Traction the unlimited parking rules on North Pearl Street between State Street and Clinton Avenue, the operation of an increasing number of W. I. A. T., Delmar and Stingerlands buses and the interference by vehicles where snow removal has not been undertaken by the city. The city should abolish these interferences.

As a possible relief for the increased time required for loading and unloading one-man cars, Mr. Vanneman believes that the rear-entrance front-exit type with the pay-as-you-enter system is the best for one-man car operation, though he feels such a plan is impossible just now in Albany.

Following a conference between Mayor Hackett and H. B. Wetherwax, vice-president of the United Traction Company, announcement was made that new schedules would be put into effect to improve service. It is unofficially reported that the city will urge the railway to put into service many of the old and experienced men employed by the company previous to the strike of January, 1921, so that the cars will be operated by trained employees.

Passenger Traffic Increasing

Sixty-three million passengers were carried last year on the interurban, suburban and Akron, Canton and Massillon city lines of the Northern Ohio Traction & Light Company. Despite the fact that 1921 business showed a sharp decline from that of 1920, traffic is now steadily increasing on all lines, as indicative of a general improvement in business conditions throughout the territory.

The company's figures show 33,000,000 passengers carried on the Akron city lines, as compared with 49,000,000 in 1920; about 16,000,000 on the interurban and suburban systems, as compared with 20,000,000 the year before last; 11,000,000 in Canton, or 4,000,000 fewer than 1920, and 1,600,000 in Massillon, as compared with 2,000,000 the preceding year. The heavy passenger records of 1920 are attributed largely to the fact that the first six months of 1920 covered an area of peak prosperity for all the cities, including Akron.

Although the gross revenue for 1921 will be lower than that of 1920, the net revenue is expected to show a slight increase, attributed to decreased operating costs.

Plan Through Interurban Service

Indianapolis Lines Anticipate Extension of Runs to Points in Four Mid-West States

Extension of through interurban service centering in Indianapolis, Ind., whereby that city may have direct connection with points over four central west states, including Ohio, Indiana, Michigan and Kentucky, is being planned by executive officers of many of the interurban systems in the Central Electric Railway Association. Further extensions may be made to include eastern coast territory.

The Terre Haute, Indianapolis & Eastern Traction Company was one of the first railways of the central Indiana division to establish through service. Four trains are run daily by it each way between Indianapolis and Dayton, on a four-hour schedule. This service was started in the latter part of December, and substitutes, in a measure, for through service that formerly prevailed between Indianapolis and Zanesville, Ohio, discontinued because of hindrances that arose as the result of the unscrambling of the Ohio Electric Railway under the receivers.

The Union Traction Company, which has its main offices at Anderson, has contemplated the establishment of through service between Indianapolis and Toledo and Cleveland, via Fort Wayne and Lima, but it is said that the plan has been given up. Connections with the two northern terminals are available through a through rate in effect, but a change of cars is necessary at Lima and Fremont.

Indianapolis will have direct interurban connection with downtown Cincinnati if plans of the Indianapolis & Cincinnati Traction Company to extend its main line from Rushville to the Ohio metropolis are carried out. The proposed extension will be by way of Metamora, Brookville and Harrison, which is on the state line, striking Cincinnati corporation line at Westwood, thence into the city, 5½ miles over the track of the Cincinnati-Westwood line, then on Queen City Avenue to the two-tube subway being built from Canal and Walnut Streets up the old Miami canal bed to Brighton.

C. L. Henry, president of the railway, said the company had held options on the Cincinnati & Westwood property for about six years and that the purchase and building of the 3,000-ft. stretch would follow the completion of an engineering survey. Decision as to the time of beginning construction work, he said, would depend on bond market conditions.

The extension of the Rushville line will give the company 111½ miles of main line trackage. The line from Rushville, southeast, will be through virgin territory and, according to Mr. Henry, will add greatly both to the freight and passenger business.

Auto Immeasurably Inferior

Jitney Service Is Maintained at Least in Part at the Expense of Trolley Riders

The Public Service Railway, Newark, N. J., has issued a statement replying to an article in the Newark *News* on a comparative census taken by the Public Utilities Board of electric railway and jitney traffic. The statement follows in part:

> In its issue of Dec. 28, the *News* printed an interesting article based on a partial census of jitney and street car traffic made by the Board of Public Utility Commissioners.
>
> The word "partial" is used advisedly because the statistics admittedly did not cover non-competitive routes, and of the eleven routes referred to no cognizance was taken of traffic handled by the street cars on such portions of said routes that the jitneys did not attempt to serve.
>
> Unless this fact be understood and kept in mind, the figures given will present a distorted picture of the comparative service rendered by the two systems. The truth is that in the metropolitan district of Newark—practically coincident with Essex County and West Hudson—the electric railway carries over three times the number of persons transported by jitneys. Moreover, the trolley routes constitute a unified and co-ordinated system, providing communication between various parts of the district and by means of transfers make this communication possible at a cost (for all but short hauls) below that charged for a like amount of service supplied by jitneys. On the other hand, the operation of the jitneys is not so co-ordinated, and in consequence the number of passengers carried by jitneys and by cars over any particular route is not a true measure of the comparative use of the two facilities.
>
> Is it not apparent that the standard of bus service does not approach the standard of electric railway service, and that no fair comparison of the rates charged by the two systems is possible without an allowance for the marked difference in the quality of service?
>
> As was stated before, the test of any local transportation system is its ability to handle the peak load, which under conditions prevailing in this district is the evening rush load, the traffic between 4:30 and 6:30 p.m. Unless the system is capable of taking care of this maximum demand it fails to meet public requirements. On the other hand, if it satisfactorily meets this test it is necessarily in a position to take care of the traffic at all other periods of the day.
>
> The Utility Board's figures prove that the jitney bus cannot take the place of the street car. The figures also prove that by slightly increasing the number of trips the street cars alone could handle all the rush hour traffic now handled by both street cars and jitney with more comfort to the passenger than the jitneys now afford that portion of the traffic carried by them.
>
> Since this is true in the rush hours it follows that the traffic for the other hours of the day could be efficiently handled by street cars alone. Incidentally it might be interesting to recall that prior to May, 1916, there were from 480 to 500 car movements over the intersection of Broad and Market Streets every day during the "peak" hour, whereas the present scheduled number of movements is 365 during the busiest sixty minutes of the day. Rerouting, owing to the opening of the Terminal, accounts for the changed conditions.
>
> As it is, jitney service is being maintained, at least in part, at the expense of those who patronize the street cars. Even if it were likely that the communities would long permit an exclusive local transportation system, the low service standard which makes it possible for the jitneys to exist, it is evident that it is only because the street cars bear the bulk of the transportation burden and assume the most costly part of the performance that the jitneys can function under existing conditions, and that were they to attempt to perform all the service they would fail in Newark as they have failed wherever the trial has been made.

In a recent editorial the *News* suggested that the local transportation tangle might come to such a pass that the part of wisdom would be to remove from electric railway operation all public restrictions, except on financial transactions, and let the trolley and jitney battle to a finish for the right to survive. In commenting on this suggestion the railway says that without attempting to forecast the result of such a contest it may be properly pointed out that were the jitney to win the consequent service to be secured by the public would be jitney service, according to jitney standards, in no way comparable with the service given by the street cars and in all respects immeasurably inferior.

Skip-Stop Returns to Indianapolis

Indianapolis is going back to the skip-stop and middle-of-the-block loading and unloading in the downtown district, according to a verbal order issued recently by the Board of Public Works to Dr. Henry Jameson, chairman of the board of directors, and Robert I. Todd, president of the Indianapolis Street Railway. Seventeen platforms to aid passengers to board the cars and alight from them will be placed soon in the downtown districts to facilitate traffic conditions. This action by the Board of Public Works carried out a suggestion made last week to the board by a committee representing the Indianapolis Chapter of the American Association of Engineers.

Five-Cent Fare Extended Three Months

The City Council of Akron, Ohio, at a meeting on Jan. 24 decided to extend the temporary 5-cent fare agreement with the Northern Ohio Traction & Light Company. The agreement expired on Feb. 1 and will now be continued until May 1. If the emergency franchise had not been extended the fare would have reverted to the old rate of six tickets for 25 cents.

According to a statement issued recently by the traction company the city cars carried only 34,322,022 passengers in 1921 against 54,937,862 in 1920. With gross earnings for the year amounting to $1,769,349 and operating expenses including taxes but not including interest charges or depreciation amounting to $1,835,619 the company claims a deficit for year of $66,070.

$2,884 Loss on Bridgeport Division

A report submitted to the Public Utilities Commission at Hartford, Conn., by President L. S. Storrs of the Connecticut Company, Hartford, Conn., concerning the operating results of the Bridgeport division, for the week ended Jan. 21 as compared with like days of the last week of the flat 10-cent fare, shows a loss of $2,884. A similar report to the commission and a comparison for the Norwalk division, which is also undergoing the 5-cent fare experiment, shows a gain of $161.17. The trial test of the 5-cent fare in both cities is for a period of ninety days, and will terminate in a few weeks.

Brooklyn Enters Whalen Bus Plan

Brooklyn, N. Y., is included in plans for a city bus system which Grover A. Whalen, commissioner of plant and structures for New York City, has submitted to the Board of Estimate. Commissioner Whalen's plan includes the substitution of bus routes numbering between 97 and 159 for the trolley lines. The change involves a $25,000,000 expenditure.

In advocating the plan the commissioner said:

> It must be recognized that the trolley system of transportation in this city has broken down. It cannot be rehabilitated financially. The plan of an adjustable fare, the "barometer" scheme, would merely be giving oxygen to a comatose system, stimulating the market in traction issues, enabling insiders to unload, doubling fares and postponing for years any real solution of the city's traction problem.

The first step in abolishing trolley service in the borough of Manhattan would be to eliminate fifteen car routes as follows:

> Broadway-Seventh Avenue, Ninth Avenue, Eighth Avenue, Sixth Avenue, Madison and Fourth Avenues, Second Avenue, Avenue B, Eighty-sixth Street (crosstown), Forty-second Street (crosstown), Thirty-fourth Street (crosstown), Twenty-third Street (crosstown), Fourteenth Street (crosstown), Eighth Street (crosstown), and Grand Street (crosstown).

The proposal of Mr. Whalen will be dealt with at greater length in the issue of Bus Transportation for February.

Plans of Mayor John F. Hylan and other city officials of New York, N. Y., for supplanting surface trolley lines of the city with buses were whipped into more concrete form at a recent public hearing of the Board of Estimate when Comptroller Craig moved that the Corporation Counsel make a formal statement as to just what steps could be taken to tear up the tracks of trolley lines that have already abandoned service. The hearing was made public in order that interested parties might discuss the bus plan projected by Mayor Hylan, which involves the tearing up of all surface tracks, and the issue of $25,000,000 corporate stock for construction, equipment and housing of 3,500 motor buses.

Fare Case Taken to State Supreme Court

The suit instituted in the Civil District Court against the Commission Council of New Orleans, La., by Attorney-General Coco, which was dismissed for want of action, has been taken to the State Supreme Court by the Attorney-General. The official just mentioned sought to deny the authority of the Commission Council to enter into an agreement with the New Orleans Railway & Light Company on a rate of railway fares below that named in its franchise. The matter will probably receive early consideration by the Supreme Court, which has, at the request of the Attorney-General, granted an advance hearing of the suit by placing it on the preferred docket of the court. Feb. 27 has been fixed as the date for the hearing. The city of New Orleans has not yet filed its answer.

Oles After the Jitneys

According to the Youngstown *Times* of Jan. 15 Mayor George L. Oles snatched time that day between granting interviews to out-of-town newspapermen and posing for movie photographers to reverse himself on a plank of his now famous platform—that calling for "throwing out the street cars and turning the streets over to the jitneys." Mr. Oles said:

> Life is too short to spend arguing with jitney drivers and the quack lawyers who come in to intercede for them.
>
> I am convinced that if the jitneys were abolished the street car fare would be 5 or 6 cents instead of 9 cents. I have already cut the number of jitneys 50 per cent by refusing licenses to men with any police record.

Oles has issued orders for enforcement of jitney regulations including one requiring a $10,000 bond, and another requiring that the interiors of all jitneys be lighted. He urged Council not to repeal the rule requiring owners and drivers to be American citizens.

Interurban Rates Advanced by Detroit United

The interurban rate of fare of the Detroit United Lines has been made 2 cents a mile instead of 1½ cents. New tariffs under the law have been filed with the Michigan Public Utilities Commission. The new rate is in accord with and under the authority of the Glaspie act governing interurban fares.

The Glaspie act authorizes the commission to appraise interurban railway properties and fix rates of fare in accord with operating expenses, maintenance of the property and a fair return upon the investment. This appraisal is now under way and when completed the commission will be able to act officially as to the necessary rates.

The Glaspie act has, however, an interim provision fixing certain temporary rates in accord with the gross receipts of the lines but absolutely without regard to the expense of operation. Under this temporary provision when the gross receipts per mile of main line track exceed $14,000 a year the fare rate is to be 1½ cents. The Detroit United earnings in 1920 were such as to compel this cent and a half rate. In 1921, however, there was a marked recession in business with the result that the gross interurban earnings fell to slightly more than $12,000, and this gross earning automatically placed the temporary rate of the company at 2 cents a mile.

While it would be permissable for the company to collect an interurban rate to and from the interurban depot in Detroit, the company will continue to apply the present rate of fare within the so-called one-fare zone.

The interurban mileage rate will continue to be from Six-Mile road on Woodward Avenue for the Pontiac and Flint Divisions; from Leesville on Gratiot Avenue for the Leesville Railway; from the Country club on Jefferson Avenue for the Shore line; from Addison on Michigan Avenue for the D., J. & C. railway, from the Junction on West Fort Street for the D., M. & T. Short Line railway, and from Turner Y on Grand River Avenue for the Orchard Lake division.

Outbound interurban riders on Woodward, West Fort and West Jefferson continue to pay the combined city and interurban fare under the agreement of joint city operation on these routes. Interurban fares for children under 12 years of age continue at half rates with a minimum collection of 5 cents.

Will Establish Resort Within Easy Reach of Trolleys

The establishment of bathing places along the lines of the system is a project that is being worked out by the officials of the Monongahela Power & Railway Company, Fairmont, W. Va., to meet young people's demands which have been growing in West Virginia communities for years. If the proper sites can be secured the company will likely establish one or two of these resorts within easy distance of each of the important cities of its lines.

It will not be the intention of the company to operate the beaches, but to secure the locations and turn them over to capable people for the operation. Officials have been looking over the ground with the intention of finding a suitable bathing place in the vicinity of Fairmont.

Sault Ste. Marie Fare Increased to Seven Cents

Seven cents is now the fare on the lines of the Sault Ste. Marie (Mich.) Traction Company. The increase was granted on order of the Public Service Commission, which stated:

> It appears in the testimony that a great many more people travel on tickets purchased at twenty for a dollar than on the straight cash fare. It also appears that the average fare for travel is .059, and that the average fare necessary to meet the operating expenses is 07. We find further that even though this commission does grant the new rate the company will still fail to receive sufficient revenue to meet the operating expenses alone, unless more passengers are carried.

Transportation News Notes

Ticket Fare Reduced.—Officials of the Adrian (Mich.) Street Railway announced recently, following the annual meeting, that the 10-cent fare would remain. Tickets, however, will be sold at the rate of six for 40 cents instead of 50 cents.

Through Freight Rates Established.—The Jamestown, Westfield & Northwestern Railroad, operating between Jamestown and Westfield and connecting with the Pennsylvania Railroad at Mayville and the New York Central and Nickel Plate railroads at Westfield, has inaugurated through freight rates over its line in connection with the Pennsylvania lines at Mayville.

Will Consider Fares.—The Public Service Commission has announced that it will hold a public hearing in Hoquiam, Wash., in the near future to consider electric railway fares of the Grays Harbor Railway, Light & Power Company. The present fare is 10 cents or three for a quarter, for both local and inter-city rates, Hoquiam to Aberdeen. It was fixed by the commission sometime ago, but has caused considerable protest from residents of both cities.

Jitney Business Unpopular in Wisconsin.—The jitney business has not proved permanently popular in Wisconsin. The Railroad Commission records show that during the past year sixty-three bonded carriers filed cancellations of their bonds, and that approximately one-third of the carriers who started in the business during 1921 did not stay with it for the year. High operating costs and lower competing street car fares are given as the reason for its unprofitableness.

P. A. Y. E. Cars Will Be Installed.—Plans for rerouting the traction lines of Jamestown, N. Y., and the placing in operation of P. A. Y. E. cars are now being made by A. N. Broadhead, president of the Jamestown Street Railway. Under the present arrangements cars operating over various lines meet in the center of the city at a central waiting room and then return over their various routes. Present plans provide for consolidating the routes so that through service will be maintained and then the waiting room can be abolished.

Protest Establishment of Motor Truck Line.—The Valley Railways, Lemoyne, Pa., and the Conestoga Traction Company, Lancaster, Pa., together with the Pennsylvania, Reading & Susquehanna River and Western Railroads, are protesting the issuance of a certificate of convenience to the Pyramid Haulage Company to conduct a motor freight service between Harrisburg, York, Lancaster, Gettysburg and points in Juniata, Cumberland and Lykins valleys. They are contending that the service is not needed.

Interurban Wins Steam Road Passengers.—The Lake Erie & Western Railroad, a steam line, with headquarters in Indianapolis, Ind., has discontinued its through train from Fort Wayne to Indianapolis and is now transferring passengers at Muncie as formerly. This condition of affairs has increased the patronage on the through interurban trains operated between Fort Wayne and Indianapolis by the Indiana Service Corporation. For the purpose of still further increasing the patronage on these trains the Indiana Service Corporation has recently been advertising extensively for the Hoosierland and the Wabash Valley Flyer, the corporation's two principal trains running between Fort Wayne and the state capital.

Personal Mention

Two Ohio Companies Make Changes

G. D. Nicoll Appointed Engineer Indiana, Columbus & Eastern—F. J. Foote Is Superintendent

Appointments for the new year have been made on the Indiana, Columbus & Eastern Traction Company and the Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio. G. D. Nicoll becomes chief engineer of both companies with direction of structures and power plants, substations and overhead lines and the distribution and sale of electrical energy. F. J. Foote becomes superintendent of motive power and equipment in charge of mechanical operation of power plants and substations and in charge of the rolling equipment, car shops and houses. For twelve years he has been connected with the Ohio Electric Railway, Cincinnati, which leases both of the above companies. He was at first the Ohio Electric Company's master mechanic, and in June of last year was appointed superintendent of power. For some time past he has been supervising the power houses and substations of the Columbus, Newark & Zanesville and Indiana, Columbus & Eastern Traction companies.

W. L. Clayton, who has acted as chief dispatcher of the Ohio Electric and assistant superintendent of the Columbus-Dayton division since 1917, will now hold the post of superintendent of the Indiana, Columbus & Eastern Traction Company, in charge of transportation of the Dayton-Union City, Dayton-Columbus and Columbus-Orient divisions.

Another appointment of interest is that of A. C. Starkey as superintendent in charge of transportation of the Springfield-Lima and Lima-Defiance divisions. On the Columbus, Newark & Zanesville Electric Railway, F. G. Clunis has been advanced to the position of superintendent of the Columbus-Zanesville and Newark-Granville divisions, and B. S. Watters of the Zanesville City Railway. G. B. Darnell will have charge of the maintenance of way and structures of all divisions of this company as roadway engineer. A. E. Peckham, as roadway engineer for the Indiana, Columbus & Eastern Traction Company, will have charge of Springfield-Lima and Lima-Defiance divisions.

A. V. Bland has been made assistant to J. H. McClure, receiver of the Indiana, Columbus & Eastern company.

Changes Made in Supervisory Forces

The Public Service Railway, Newark, N. J., announces the following changes in supervising forces. Aaron H. Hill, supervisor at Roseville, becomes assistant division superintendent. Frank Lindner, depot master at Roseville, has been made supervisor at Roseville. William Eckert, station master at Hilton carhouse, has been made supervisor of the Bergen Street carhouse, and Arthur Symington, supervisor of the West New York carhouse.

Mr. Arkwright Carries On

President of Georgia Railway & Power Company Puts in Force Decided Innovations

Preston W. Arkwright, the energetic president of the Georgia Railway & Power Company, Atlanta, Ga., is hitting the bull's-eye with phenomenal success in dealing with the public and with employees. His are no pot-shots. They are carefully aimed, coolly executed and sure of the mark. In other words, to leave the field of the marksman, Mr. Arkwright is that person known as a successful leader of an electric railway.

"Mr. Arkwright and His Baby Daughter"

If one thing more than another can be said to account for Mr. Arkwright's excellent administration since he became president in 1912, it is ideas faithfully carried to completion. It is mere reiteration to recall Mr. Arkwright's former rôle as Moses in leading the Georgia Railway & Electric Company from that troublesome land of public dislike and financial distress into the promised land of public trust and pecuniary success. Through straightforward dealings, Mr. Arkwright made the company famed for the civility and kindness of its employees, and for its liberal and fair treatment of the public.

So much for history, but Mr. Arkwright continues to give historians a chance to scribble a few notes. He has, for example, not let well enough alone in the company's relation to a public which he will not damn, but constantly is striving to make traveling safer, quicker, more enjoyable. Ergo, this latest innovation in Atlanta: Thirty supervisors of the company have been given complete police authority. They are clothed in the regulation supervisor uniform of the company, but in addition they wear the regulation police badge on cap and coat. The men who are assigned to the down-town district also wear a medallion on the left arm, signifying that they are members of the traffic squad. These men are all provided with rainy-day uniforms—white rubber coat, cap and boots—which mark them plainly on gray days. In white or in blue, it is Mr. Arkwright's idea that the Georgia Railway & Power Company's men shall be constantly on the job to serve.

One thing Mr. Arkwright has never forgotten, namely, that his company is made up of human beings and that his company is constantly serving human beings. An observer of Mr. Arkwright's activities recently remarked, "There is a man who is filled with the milk of human kindness." A recent manifestation of this kindness and fairness is the wage agreement between the company and the employees in which no attempt was made to reduce the wages below what were paid in 1921. Instead a new method was used whereby a new wage scale was instituted for men employed after Jan. 1 as motormen or conductors, and in shops and carhouses.

Lenny, Photographer

"Mr. Arkwright and His Daughter's Baby"

Mr. Arkwright's life has been spent almost exclusively in the South. He was graduated from the University of Georgia in 1891, studying law during his last year there. He began the practice of law in Atlanta and ten years later championed the cause of the unification of the electric railway and lighting systems of the city into the Georgia Railway & Electric Company. From 1902 until 1912 as president he guided the development of the utility company, but in the latter year resigned to become president of the Georgia Railway & Power Company, which leased the former property.

Mr. Greenland Honored Again

Popular Operator in Charge of Fort Wayne Lines Is Selected to Head Central Association

Samuel W. Greenland, newly elected president of the Central Electric Railway Association, is vice-president and general manager of the Indiana Service Corporation, Fort Wayne, Ind. This company owns and operates the electric railways in Fort Wayne, Wabash, Peru and Logansport, and the interurban lines connecting Fort Wayne with these cities and with Lafayette and Bluffton, Ind., and does a general power and lighting business.

Mr. Greenland's selection to head this important railway association comes after long interest and activity in the work of the association and bespeaks the well-placed confidence and esteem with which he is held by the members generally. Calm, energetic and aggressive in striving for the betterment of his company and its service, and with a broad, sound view of the utility field, he is respected by his contemporaries and associates, and has that wholehearted respect and loyalty and good will of his employees which makes for best company and public relations.

Mr. Greenland was born at Clarion, Pa., on April 27, 1879, and was educated at the Pennsylvania Military College, Chester, Pa., and at Penn State University, where his work in electrical engineering was concluded in 1900. His first job in the utility field was with the Bell Telephone Company at Pittsburgh in connection with construction work. In 1904 he became connected with Robert W. Watson, consulting engineer, Harrisburg, Pa., where for three years he was engaged principally in making engineering reports for financial interests. In 1907 he became general manager of the Columbus Railway, Light & Power Company, which furnishes the gas, electric light and railway services in Columbus, Miss. At the time the Wabash Valley Traction Company was reorganized to become the Fort Wayne & Northern Indiana Traction Company, in 1911, he went to Fort Wayne as assistant general manager and later in the same year was made general manager. Upon the reorganization of this company into the Indiana Service Corporation in 1920, he was elected vice-president as well as general manager.

In addition to his connection with the Indiana Service Corporation, he is general manager for the receiver of the Fort Wayne, Van Wert & Lima Traction Company, general manager of the Fort Wayne & Decatur Traction Company, and president of the Service Coal Company, Fort Wayne.

Mr. Greenland has been an officer of the Central Association for the past three years and a member of the executive committee for some five years. He is a member of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers. He has been active in local affairs and is a past president of the Rotary Club of Fort Wayne. He is also active in the work of the American Electric Railway Association, and is now a member of the committees of that association on the trackless trolley and one-man car. In 1917 he served as president of the Indiana Electric Light Association. During the war he was a major in the chemical warfare section of the army and had charge of the erection of a 20,000-kw. steam generating station at the Edgewood (Md.) Arsenal. He also looked after the operation of the utilities at Edgewood.

Mr. Collier at Poughkeepsie

W. Rawson Collier has resigned as general sales manager for the Georgia Railway & Power Company, Atlanta. He has been connected with the company at Atlanta for ten years in the capacity mentioned and is nationally known in public utility circles as an engineer acquainted with all features of gas and electric service. He will take an important executive position with the Central Hudson Gas & Electric Company, Poughkeepsie, N. Y. He will be succeeded at Atlanta as sales manager by his brother, C. A. Collier, who has been assistant sales manager since 1914.

Mr. Collier has been associated with the Georgia Railway & Power Company since 1905, when he entered the company's engineering department. Three years later he became contract agent and in 1912 was promoted to the position of sales manager. During 1919 and 1920 Mr. Collier was both sales and operating manager.

His technical education Mr. Collier received at the Massachusetts Institute of Technology, where he was graduated in 1900. He entered the firm of Collier & Brown after finishing college, designing and constructing many electric lighting plants in the Southern states.

Phillips General Manager in Muskogee

John G. Phillips, for many years manager of electric railway properties, has been appointed general manager of the Muskogee (Okla.) Electric Traction Company, and the Shawnee-Tecumseh Traction Company, Shawnee, Okla. He succeeds A. B. Coryell, who has been serving temporarily since the resignation of W. M. Cutlip in November of last year.

From 1920 to 1921 Mr. Phillips was general superintendent of the Mobile Light & Railroad Company, Mobile, Ala. Before taking that position he was with Ford, Bacon & Davis, engineers, doing valuation work for them. Mr. Phillips was previously purchasing agent and superintendent of rolling stock of the Hudson Valley Railway, Glens Falls, N. Y., and for some time was assistant general manager of the company operating there.

N. B. Rhodes Park Purchaser of New Orleans

Norman B. Rhodes, New Orleans, who has had a long and varied experience with public utilities north and south, has been appointed superintendent of purchases for the Board of Park Commissioners of New Orleans. After graduating from the Cheltenham Military College, Mr. Rhodes entered the service of the Richmond Railway & Power Company, Richmond, Va., and later that of Stone & Webster, at Savannah, Ga. He was superintendent of the Beaumont (Tex.) Traction Company and of the Southern Railway & Light Company, Natchez, Miss. He left his position as superintendent of the electric and railway departments of the Jackson Light & Traction Company, Jackson, Miss., to enter the navy at the beginning of the war. He was on duty at the Algiers Naval Station and afterward supply officer of the U. S. S. Edgar F. Luckenbach until the close of the war.

R. F. Busher, who has for some time been chief of the Bureau of Accounts and Statistics of the Public Service Commission of Pennsylvania, has resigned from that position. On Feb. 1 he will enter the practice of public accounting.

Samuel Riddle, vice-president of the Louisville (Ky.) Railway, was elected a director of the Louisville Board of Trade at the annual meeting on Jan. 10. This is the first time that a representative of the railway has even been on the directorate of the Board of Trade.

Roy L. Duncan, for the past ten years in the employ of the Connecticut Company, Hartford, Conn., and its predecessors as foreman of the welding, grinding and bonding department at the Hartford division, has left the employ of the company. He is to take a position as service man in the New England territory for the Rail Welding & Bonding Company of Cleveland, Ohio. Mr. Duncan has been presented with a traveling bag and equipment by members of the track department. He assumed his new duties on Feb. 1, and his work will take him to all points in New England.

Fred Durant, Troy, N. Y., was recently appointed traffic superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J. He is an electric railway executive with wide operating experience. He secured a position as conductor in 1893 with the Troy & Lansingburg Traction Company and after working at that position for a time became a motorman. Later he was promoted to inspector, and in 1917 was advanced to the position of division superintendent with quarters at the North Troy carhouse. In 1900 the Troy & Lansingburg and the Troy City Traction companies were merged under the name of the United Traction Company and Mr. Durant remained with the new company in the same position.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES
BUSINESS ANNOUNCEMENTS

Steel Pole Sales Increase

There are many inquiries for steel poles and investigation discloses that these queries are the forerunners of much proposed spring construction. There are quite a number of combination railway and lighting pole jobs awaiting favorable action but electric railway companies are buying only such poles as are necessary, on account of their generally poor financial condition. On the other hand, central station companies and those municipalities owning their own lighting poles are in much better financial condition. One solution of the problem put forward by an interested manufacturer, is to have the lighting company collect sufficient funds to provide steel poles for lighting and charge a proportion of their cost to the electric railways for use as span supports. One company reports some export inquiries.

Current prices are said to be on a level with those prevailing in June, 1916. There was a general drop in prices during the last quarter of 1921. The market at the present moment is firm, and it is doubtful whether there will be any further downward reduction for some time to come. Deliveries are good, ranging from thirty to sixty days on tubular steel poles and one to three weeks on steel towers.

The outlook, manufacturers agree, is for better business all through 1922 than during 1921. The increase is expected to be very gradual but permanent.

Good Prospects for Electrical Exports in 1922

Optimism over the prospects for American exports of electrical equipment this year is expressed by E. D. Kilburn, vice-president and general manager of the Westinghouse Electric International Company.

Mr. Kilburn points out that America leads the world in many electrical lines and can compete with any nation in these lines in spite of her high labor costs. He also states that German competition need not be feared, for Germany's manufacturing capacity is limited, and that when she has obtained a certain amount of electrical business her deliveries will become uncertain and her prices will rise.

During the past year both Chile and Japan placed large orders for electrical material in America and there is every reason to believe that we will receive an increasing amount of business of the same character. Every generator installed immediately creates a market for at least three times its capacity in smaller apparatus, such as transformers, meters, industrial motors and domestic ware. Hence the demand for electric appliances increases in a geometrical ratio and America is in a fair position to get its full share of this rapidly growing business.

Signal Contract Awarded

The Philadelphia & Garrettsford Street Railway has awarded a contract for the complete installation of new electro-pneumatic interlocking at its Sixty-ninth Street terminal, Philadelphia, to the Union Switch & Signal Company. The layout includes forty-three functions, consisting of twenty-one switches and twenty-two signals, which will be controlled from twenty-three working levers in a twenty-three-lever frame electro-pneumatic interlocking machine. Style "C" cut-off switch valves will be used throughout.

All new signals will be of the style "N" color light type. Alternating-current track circuits will be installed throughout the interlocking so as to provide for semi-automatic control of signals and electric detector locking.

Electrification of Swiss Federal Railways

Commerce Reports for Jan. 30 states that 57,000,000 francs have been credited in the Swiss budget of 1922 for electrification of the Federal railways. It is hoped that the electrification of the Bellinzona-Lugano-Chiasso, the Erstfeld-Lucerne and the Goldau-Zug lines will shortly be completed. The Amsteg power station, of 80,000 hp. will be ready to furnish energy about April, 1922, and the Lucerne-Zug-Zurich line will probably be electrified by the end of the year. Together with the St. Gothard, the Sion-Lausanne line is to be electrified, and will be opened in the summer of 1923. The current will be supplied by the 60,000 hp. Barberine station

Lumber Demand Increases After Holiday Slump

Reports from various mill centers to the American Wholesale Lumber Association indicate a slow recovery in lumber demand for the first week after the usual holiday recession. Production was at 68 per cent of normal, new business at 59 per cent of normal, and shipments at 62 per cent. Yellow pine orders exceeded fir orders for the first time since Dec. 3, 1921. On the Pacific Coast both rail and export orders fell off, although moderating weather permitted rail shipments in excess of the last of November, 1921.

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 31, 1922

Metals—New York

Copper, electrolytic, cents per lb.	13.31
Copper wire base, cents per lb.	15.12½
Lead, cents per lb.	4.40
Nickel, cents per lb.	32.00
Zinc, cents per lb.	4.85
Tin, Straits, cents per lb.	32.00
Aluminum, 98 to 99 per cent, cents per lb.	19.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.72
Somerset mine run, Boston	1.87
Pittsburgh mine run, Pittsburgh	2.15
Franklin, Ill., screenings, Chicago	1.92
Central, Ill., screenings, Chicago	1.52
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, per gross ton	40.00
Standard open hearth rails, per gross ton	40.00
Railroad spikes drive, Pittsburgh base, cents per lb.	2.22
Tie plates (flat type), cents per lb.	2.00
Angle bars, cents per lb.	2.40
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.12½
Steel bars, cents per lb.	1.50

Hardware—Pittsburgh

Wire nails, cents per lb.	2.50
Sheet iron, (24 gage), cents per lb.	2.85
Sheet iron, galvanized, (24 gage), cents per lb.	3.55
Galvanized barbed wire, cents per lb.	3.15
Galvanized wire ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	13.00
Waste, cotton, (100 lb. bale), cents per lb.	
White	10.00
Colored	9.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal.	77.00
White lead, (100 lb. keg), cents per lb.	12.25
Turpentine (bbl. lots), cents per gal.	93.00
Car window glass (single strength), first three brackets, A quality, discount*	85%
Car window glass (single strength), first three brackets, B quality, discount	86%
Car window glass (double strength, all sizes, A quality), discount	85%
Putty, 5 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Rubber-covered wire, cents per lb.	6.50
Weatherproof wire base, cents per lb.	16.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd.	$3.25
Common, per sq.yd.	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.17
Crushed stone, ¾ in. carload lots, N. Y. per cu.yd.	1.80
Cement, Chicago consumers net prices, without bags	1.97
Gravel, ¾ in. cu.yd. N. Y.	1.75
Sand, cu.yd. N. Y.	1.00

Old Metals—New York

Heavy copper, cents per lb.	10.87½
Light copper, cents per lb.	8.37½
Heavy brass, cents per lb.	5.125
Zinc, old scrap, cents per lb.	2.25
Yellow brass, cents per lb. (Heavy)	5.50
Lead, heavy, cents per lb.	3.62½
Steel car axles, Chicago, net ton	$12.75
Old car wheels, Chicago, gross ton	12.25
Rails (short), Chicago, gross ton	15.25
Rails (rerolling), Chicago, gross ton	12.25
Machine turnings, Chicago, net ton	4.75

Standard Underground Makes Changes in Personnel

The Standard Underground Cable Company, New York City, N. Y., has sent out an announcement of the following changes in its sales organization: Atlee B. Saurman has been appointed general sales manager, with headquarters in Pittsburgh, Pa.. Mr. Saurman has been with the company over twenty years, during which period he served for several years as manager of the Boston office, for twelve years as manager of the Pacific Coast department, with headquarters at San Francisco, and for the past seven years as manager of the Southeastern sales department, with headquarters at Philadelphia, Pa. Edward Kerschner has been appointed manager of the new Southeastern sales department, with headquarters in Washington, D. C. Mr. Kerschner has been for many years past connected with the Pittsburgh and Philadelphia offices and, since it was established, manager of the Washington district office. A sub-office of the sales department will be continued in Atlanta, Ga., with J. A. Peacock in charge as formerly. F. O. Hoyt, formerly and for many years on the staff of the company's New York Sales department, has been appointed manager of the Philadelphia sales department, which department will have charge of eastern Pennsylvania, southern New Jersey and Delaware.

Tramway Concession in India

According to press reports, the Dehra Dun Mussoorie Electric Tramway has been registered in India with the object of building a tramway between Dehra Dun and Mussoorie, the necessary concession having been granted by the United Provinces Government. The preliminary estimate of the cost of the work is 3,662,000 rupees.

Further information relative to this project can be obtained from the Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, D. C., by referring to Miscellaneous Exhibit No. 229.

Rolling Stock

United Electric Railways, Providence, R. I., has just placed an order for twenty-five new standard type one-man cars with Osgood-Bradley Company. Delivery is promised for March.

Chicago (Ill.) Surface Lines lost seventy-eight passenger cars and twelve miscellaneous service cars in the fire which destroyed the Devon Avenue carhouse on Jan. 26. The property damage was $1,000,000. Further details of the fire are published elsewhere in this issue.

Los Angeles (Cal.) Railway has started reconstruction of 106 cars. The program will occupy the greater part of 1922 giving a maximum number of cars available for the heavy traffic of next Christmas. The cars to be rebuilt are known as P. A. Y. E. No. 2 and they will be converted into P. A. Y. E. No. 1. Instead of a single step at the rear the cars will have a double step divided for exit and entrance. They will be lengthened from 39 ft. 1⅛ in. to 44 ft. 6 in., giving two more seats and larger loading platforms. The estimated cost of the work is $212,000. A similar program was carried out in 1921. The 1922 work will bring all passenger cars up to modern standards.

The Kentucky Traction & Terminal Company, Lexington, Ky., has purchased ten semi-steel cars for interurban service between Toledo and Sylvania, Ohio. The cars are 40 ft., 3 in. long and have a seating capacity of forty-four. The bodies will have curved sides and the exterior will be finished in chrome yellow. Arch-bar trucks will be used with a 5-ft. wheelbase and 26-in. diameter steel wheels. Other details of the equipment include General Electric type 264 motors, K-35 control, C.P. 27 compressors, G.E. type J-12 headlight with resistors and a 500-watt lamp. The seats will have plush upholstering and automobile spring cushions, and arm rests. The cars are being built by the Cincinnati Car Company, and will weigh 25,000 lb.

Track and Roadway

Dallas (Tex.) Railway is at work installing block signals and electric switches on its Belmont-Vickery line.

Durham Public Service Company, Durham, N. C., is laying new rails on Chapel Hill Street.

British Columbia Electric Railway Vancouver, B. C., will start work right away on the double-tracking of Cook Street.

Shreveport (La.) Railways will start work on filling in its tracks on Jacobs Street, the line in Marshall Street, in Park Avenue and in Lillian Street. The tracks will be plotted with grass.

Kitchener, Ont.—A by-law will be submitted to the ratepayers providing for the raising of $63,000 for extending the railway line east along King Street, for a double track and for the corporation's share of the cost of a station on King Street, east.

Shops and Buildings

Aurora, Elgin & Chicago Railroad, Aurora, Ill., has been authorized by Federal Judge Evan A. Evans to erect an $8,000 freight house at Aurora. This will obviate the necessity for the company to run its freight cars into the business district and will relieve congestion there.

Pacific Electric Railway, Los Angeles, Cal., and the Southern Pacific Company have authorized establishment of a joint freight terminal in Long Beach on the west side of the flood control channel near Seventh Street. Work will start as soon as the city has given permission. The Southern Pacific will abandon its Broadway tracks and freight depot and yards, and the Pacific Electric Company will discontinue its use of the freight yard at Fifth Street and American Avenue. This company will reach the new depot over its San Pedro and Wilmington tracks on Commercial Street.

Trade Notes

Bridgeport Brass Company, Bridgeport, Conn., announces the personnel of its executive staff as follows: F. J. Kingsbury, chairman of the board; Carl F. Dietz, president and general manager; W. R. Webster, vice-president; F. J. Kingsbury, treasurer; R. I. Neithercut, secretary; W. D. Blatz, general sales manager; W. R. Clark general works manager; E. G. Oakley, works manager fabricating division; Arthur Brewer, works manager mill products division.

Dwight P. Robinson & Company, New York, N. Y., already doing large construction work for the Brazilian Government in northeastern Brazil, was awarded the contract for construction of the exposition building which will hold the exhibits of the United States at the Brazilian Exposition in September. The exposition will open Sept. 7 and is in commemoration of a century of Brazilian independence. The White House recently announced that the American building would be constructed and designed for permanent use as embassy headquarters.

New Advertising Literature

The Hardinge Company, Inc., New York, N. Y., has issued a new bulletin, No. 12, on the Quigley fuel systems, comprising the preparing, transporting and burning of pulverized fuels.

Ward Leonard Electric Company, Mount Vernon, N. Y., has issued a booklet describing its various types of "vitrohm" (vitreous enamel) field rheostats. The company is also distributing a four-page leaflet covering the Ward Leonard automatic motor starter of the counter emf. style.

Corliss Carbon Company, Bradford, Pa., has issued a new catalog No. 7 giving information about the selection and application of carbon brushes. This contains data on the physical characteristics of brushes as well as their composition, mechanical details and the various grades of manufacture.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just published Leaflet 1,825, describing arc welding for repair and reclamation, general applications of arc welding and arc welding for manufacturing processes. A story is told of how costs are reduced by the use of arc welding.

Speaking of
Investments

Figure each part of your safety car equipment to pay you a return in some form on its original cost. The choice of the right hand brakes is one good item to work on.

PEACOCK
Staffless Brakes

These are hand brakes you can count on for sure savings—in safety and in maintenance costs.

Designed for Safety Cars

"The Peacock Staffless"

Peacock Staffless Brakes were brought out when the safety car first appeared. They were especially designed by us, to be in line with, and equal to the rest of the splendid safety devices with which these popular little cars are provided. The braking power of the Peacock Staffless, and the speed with which it can be applied are factors of utmost importance to operators of safety cars. You install hand brakes—not because the air brakes are likely to fail—but because they may possibly fail under some unforeseen condition or accident. Then you want an emergency hand brake which is really designed to serve—and will serve—the purpose, namely to stop the car in the shortest possible time.

Peacock Staffless Brakes are still the only Safety Car hand brakes which have power, speed and capacity combined to the best advantage to fill this requirement.

National Brake Company, Inc.
890 Ellicott Sq., Buffalo, N. Y.

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Incorporated
Business Established 1894
PHILADELPHIA NEW YORK SAN FRANCISCO
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Appraisals and Reports
CLEVELAND NEW YORK
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"It cuts some ice"—

whether or not you are ready for winter weather. Don't let the first icy storm of the coming season catch you unprepared and disorganize your service or tie-up your system.

ANDERSON

Sleet Wheels and Cutters

in sufficient quantity to meet any conditions, should be ordered now and held in reserve. The day will soon be here when you'll want them in a hurry.

TRADE MARK

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Established 1877

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When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

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of the City of New York

Capital $1,500,000
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Offers to dealers every facility of a New York Clearing House Bank.

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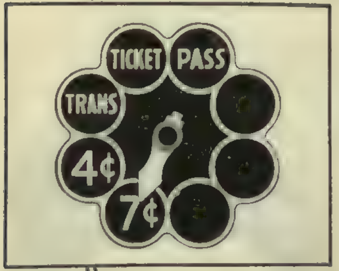
ENGINEERS
Design, Construction
Reports, Valuations, Management
NEW YORK PHILADELPHIA CHICAGO

The Most Successful Men in the Electric Railway Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week

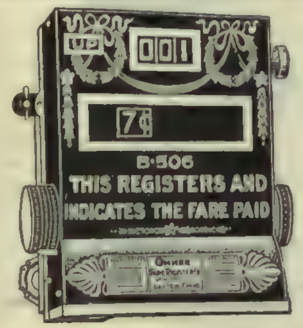
IT'S MIGHTY IMPORTANT



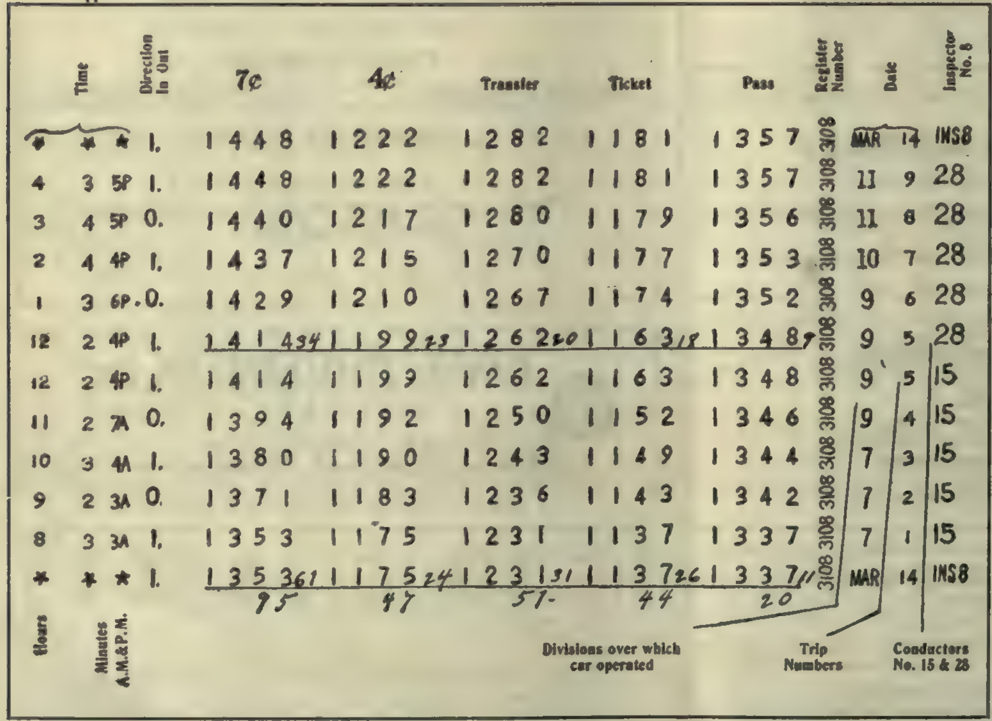
Does your conductor sell transportation or is he simply the custodian of a collection box?

If your cars are equipped with Ohmer Fare Registers, he is a salesman and you will soon find out just how much of a salesman he is. He will have a live interest in boosting your business. He will be placed on the same basis as the high class retail salesman in a store who is protected and who protects his employers and the public by means of the cash register.

Whether you operate interurban or city cars, two-man cars, one-man cars or motor buses, Ohmer Fare Registers will exactly meet your requirements.



Ohmer Fare Register Company
Dayton, Ohio



Time			Direction In Out	7¢	4¢	Transfer	Ticket	Pass	Register Number	Date		Inspector No. 8
*	*	*	I.	1448	1222	1282	1181	1357	3108	MAR	14	INS8
4	3	5P	I.	1448	1222	1282	1181	1357	3108	11	9	28
3	4	5P	O.	1440	1217	1280	1179	1356	3108	11	8	28
2	4	4P	I.	1437	1215	1270	1177	1353	3108	10	7	28
1	3	6P	O.	1429	1210	1267	1174	1352	3108	9	6	28
12	2	4P	I.	1414 34	1199 23	1262 20	1163 18	1348 9	3108	9	5	28
12	2	4P	I.	1414	1199	1262	1163	1348	3108	9	5	15
11	2	7A	O.	1394	1192	1250	1152	1346	3108	9	4	15
10	3	4A	I.	1380	1190	1243	1149	1344	3108	7	3	15
9	2	3A	O.	1371	1183	1236	1143	1342	3108	7	2	15
8	3	3A	I.	1353	1175	1231	1137	1337	3108	7	1	15
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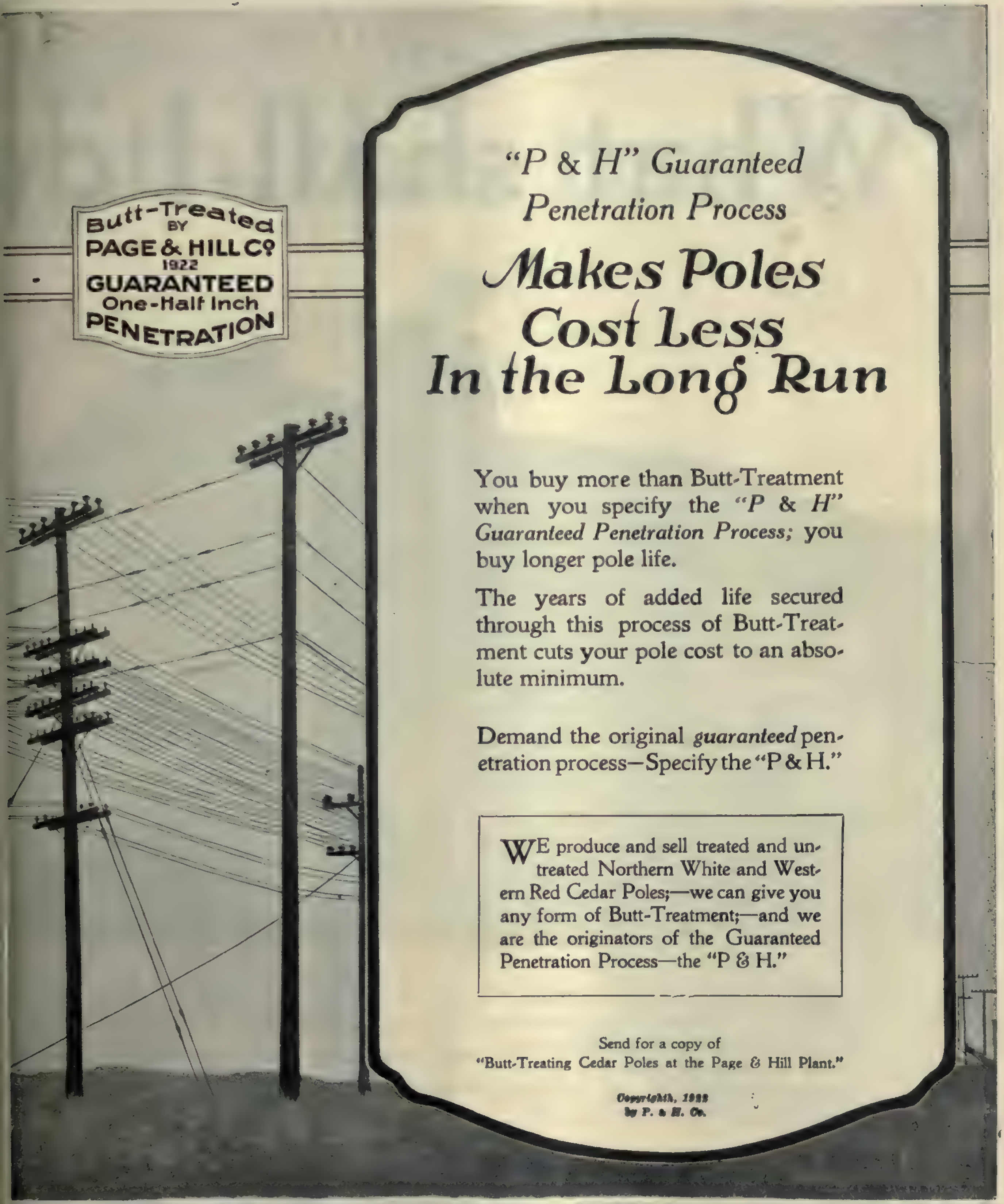
				95	47	51-	44	20				
Hours	Minutes	A.M.&P.M.										

Divisions over which car operated

Trip Numbers

Conductors No. 15 & 28



"P & H" Guaranteed Penetration Process

Makes Poles Cost Less In the Long Run

You buy more than Butt-Treatment when you specify the *"P & H" Guaranteed Penetration Process;* you buy longer pole life.

The years of added life secured through this process of Butt-Treatment cuts your pole cost to an absolute minimum.

Demand the original *guaranteed* penetration process—Specify the "P & H."

WE produce and sell treated and untreated Northern White and Western Red Cedar Poles;—we can give you any form of Butt-Treatment;—and we are the originators of the Guaranteed Penetration Process—the "P & H."

Send for a copy of
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The approaching question:

“What shall I d

The maintenance on this track by using shims has been enormous and is only short lived. The rails appear to be good, but the joints are battered and low and the constant hammering over them is ruinous to the rolling stock, not to say a word about the lost current. If I could find a cure for this condition at not too great a cost, I believe I could postpone rebuilding this track for six or seven years, and by that time this Company may be in better financial condition.

DAYTON

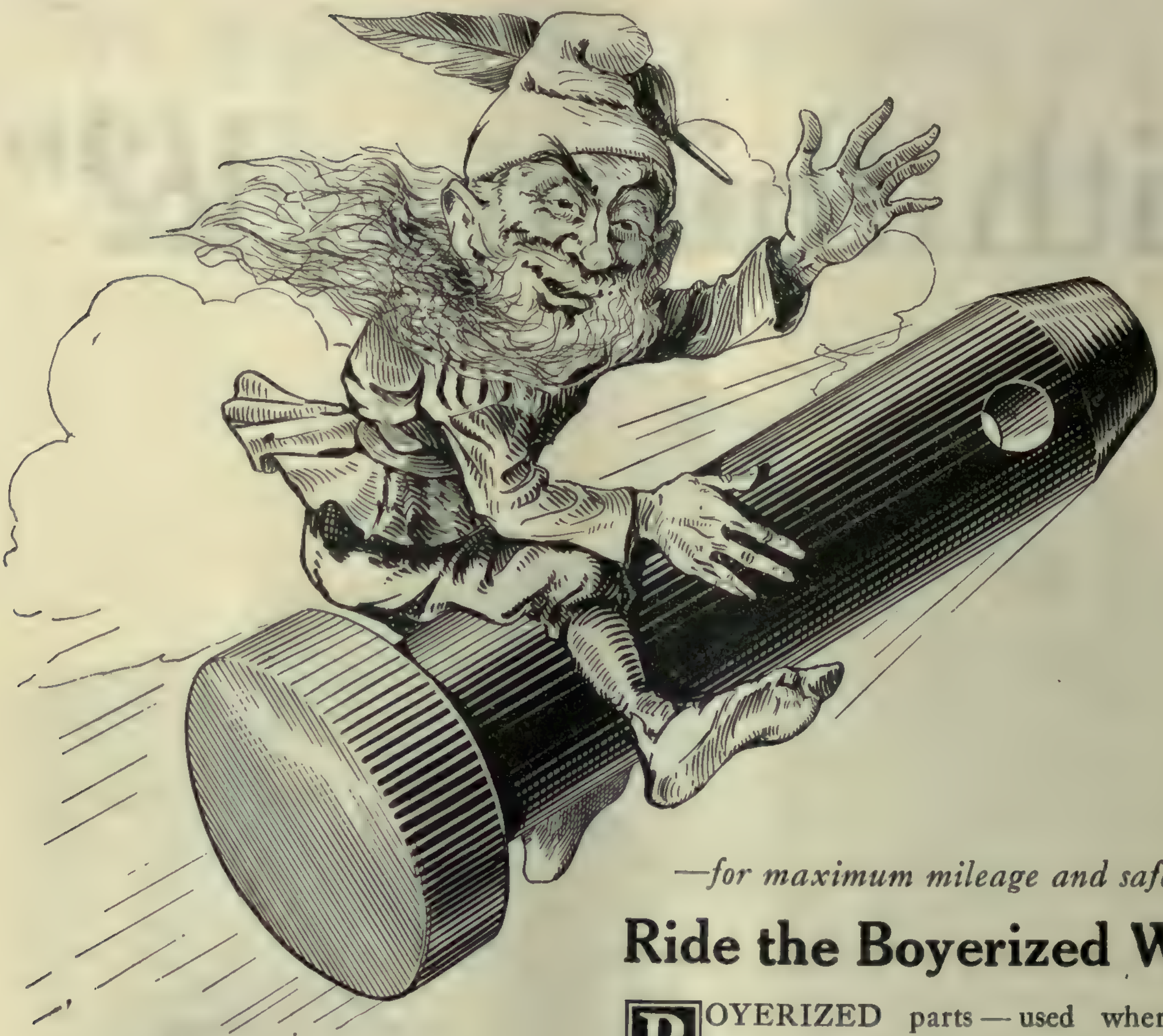
with this track?"

I have it!

I'll use those Dayton Resilient Joint Boosters. They allow the use of concrete under the Booster, and provide for a shock absorber in the Booster itself, which saves the concrete from breaking up under the hammer blows; moreover, they can be installed without any interruption to traffic. The price of $4.50 for a "Booster" is a mere nothing because the chief expense of repairing a bad joint is the tearing out of the old paving and replacing it, whereas if I add the Booster to the job I can forget about the repairs for several years. The old saying, "Opportunity only knocks at your door once is true," so I will not let it be said that I passed up an opportunity, but will order the Joint Boosters at once.

Resilient
JOINT BOOSTER

**THE DAYTON
MECHANICAL TIE COMPANY**
708 Commercial Building
DAYTON, OHIO



—*for maximum mileage and safety*

Ride the Boyerized Way

BOYERIZED parts — used where the strain, the pounding and the wear of service comes on cars—will last about four times as long as ordinary untreated steel. They have so much superiority in strength and durability, at such a trifling additional first cost, that not even the most impoverished company can afford to pass up this chance for an ultimate economy.

Brake Hangers
Brake Levers
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"TIGER" BRONZE

AXLE AN

ARMATURE BEARINGS

Performance Alone is the Real Test

The most practicable ideas that intelligent experiment and exhaustive tests have shown will lead to greater service and reduced maintenance expense are incorporated into "Tiger-Bronze" axle and armature Bearings.

You may be able to buy other bearings for less money but there's a difference between "Tiger-Bronze" Bearings and others and that difference represents a saving in bearing replacements, in the rewinding of Armature Coils and in the additional revenue derived from keeping the cars in service that will pay for "Tiger-Bronze" Bearings many times over every year.

That's the reason they are generally considered standard in the field of electric railway operation.

More-Jones Brass & Metal Co.
St. Louis, Mo.

TROLLEY WHEELS:
V-K Oilless, M-J Lubricated
HARPS: V-K *Non-Arcing*
BEARINGS: *"Tiger" Bronze*
Axle and Armature
ARMATURE BABBITT
and Similar Products

MORE-JONES

In Chicago and Outside!

On the long, fast elevated passenger trains, and the heavy electric switching locomotives of the Northwestern Elevated Railroad of Chicago, they use reliable, long-wearing "Standard" Rolled Steel Wheels. And then too, on that high-speed interurban line,—the Chicago & Milwaukee Electric Railway—now famous for superlative service, speed and safety they also use them.

"STANDARD"

Steel Tires
Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Gear Blanks
Steel Forgings **Iron Forgings**
Forged and Rolled Steel
Pipe Flanges
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500 North Broad St., Philadelphia, Pa.

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MEXICO, CITY
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Standard Helical Gears

Rounded Teeth
form a ready means of identification and eliminate sharp corners.

An Operator Reports

"Using a new Helical Pinion with a partly worn gear gave perfect and quiet running."

R.D. NUTTALL COMPANY
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Nuttall

"49"

THE map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels. [illegible]

[illegible]

Chicago, 3
St. Louis, 2
Buffalo, 4
Pittsburgh, 2
Cleveland, 2
Amherst, N. S.
Montreal
Mich. City, Ind.
Louisville
Mt. Vernon, Ill.
Ft. Wayne, Ind.
Birmingham
Atlanta
Savannah
Boston
Detroit
St. Paul
Kansas City, Kan.
Denver
Tacoma
Rochester, N. Y.
Sayre, Pa.
Berwick, Pa.
Albany
Toronto
New Glasgow, N. S.
Madison, Ill.
Huntington, W. Va.
Wilmington, Del.
Houston, Tex.
Hannibal, Mo.
Reading, Pa.
Baltimore
Richmond, Va.
Ft. William, Ont.
St. Thomas
Hamilton
Ramapo, N.JY.
Marshall, Tex.
Los Angeles
Council Bluffs

American Railroad Association Standards

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
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CHILLED IRON WHEELS

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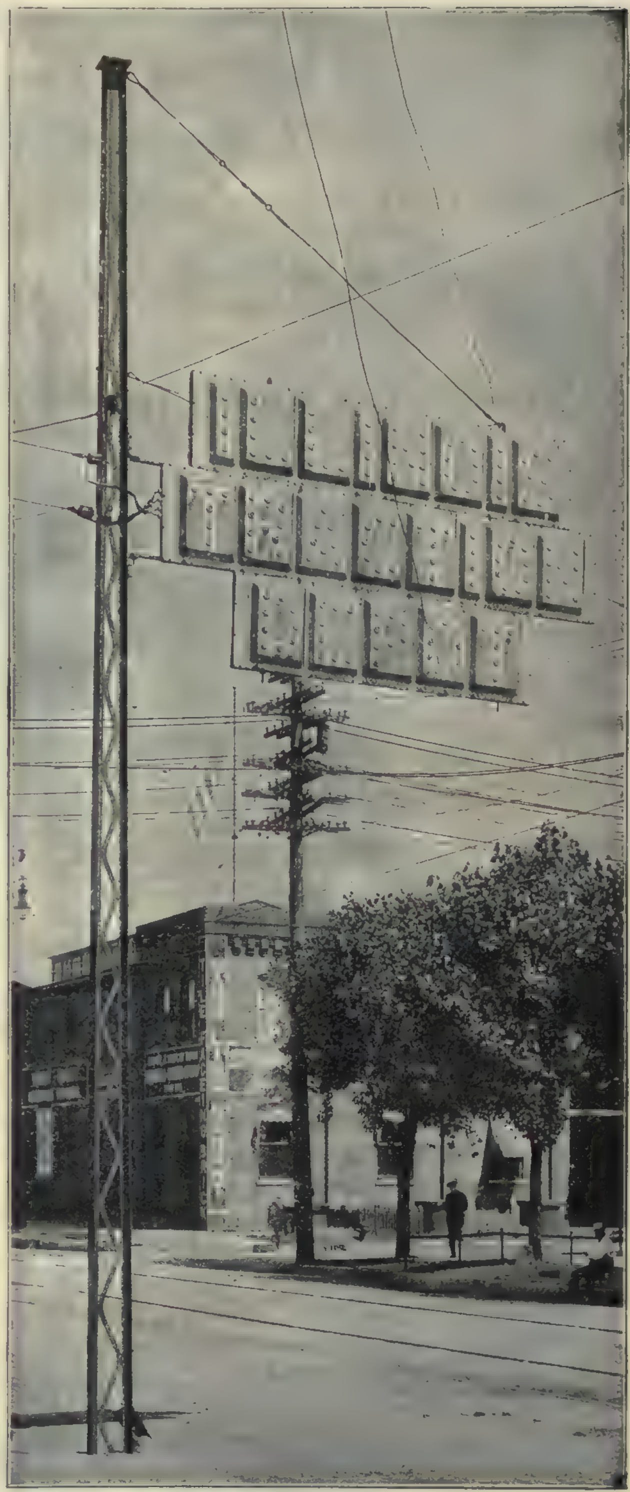

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vs.

Special Quenched

The "Tool Steel" pinion wore out after 239,136 miles.

Special quenched pinions wore out in 50,000 to 60,000 miles.

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4 to 1
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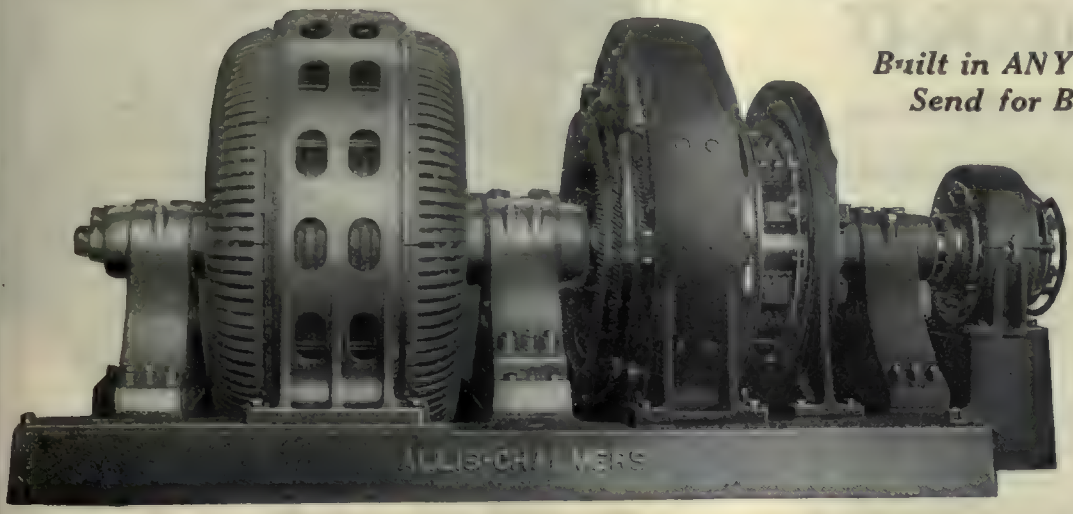

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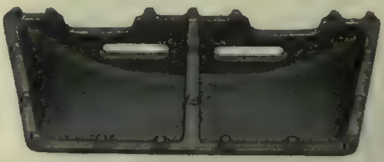

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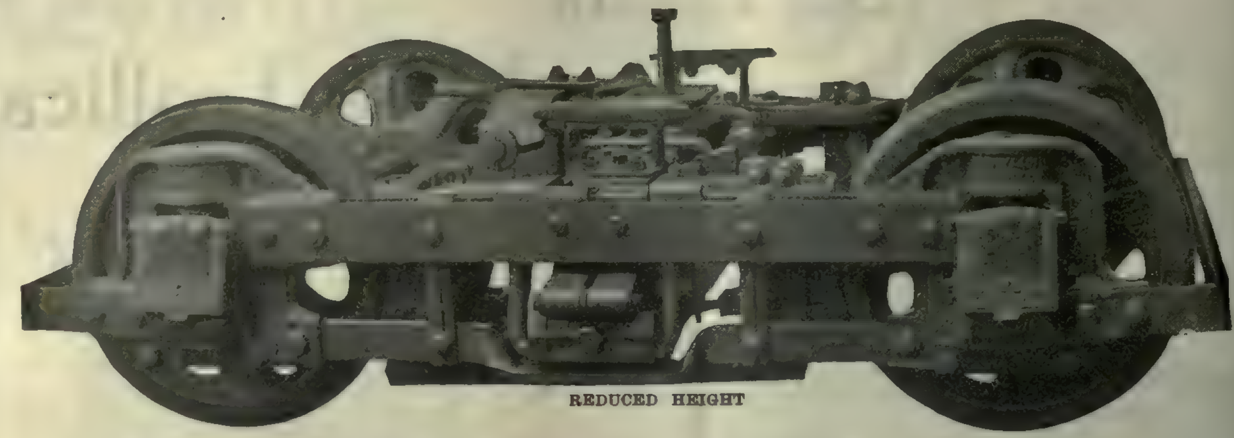

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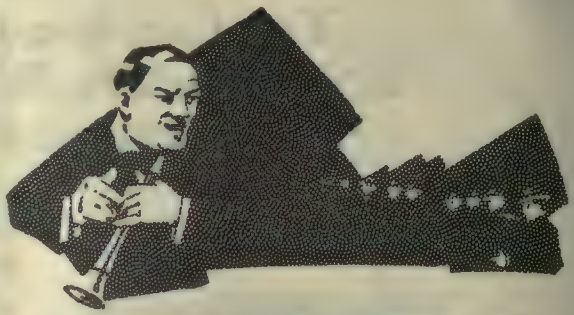

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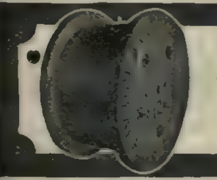

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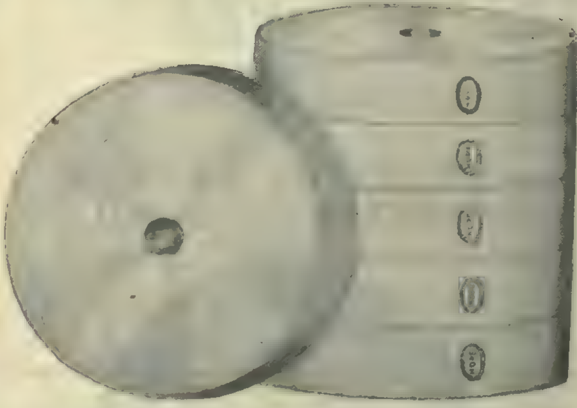

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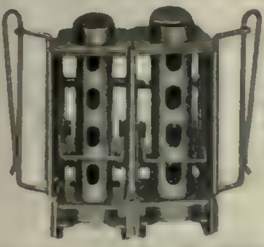

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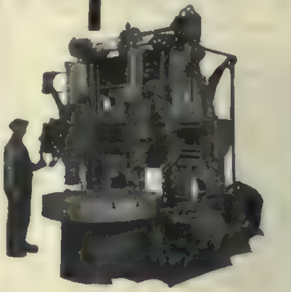

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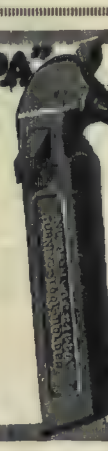

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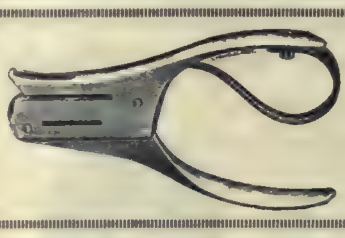

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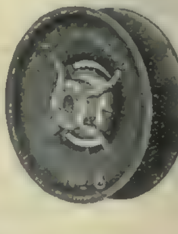

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for Monitor and Arch Roof Cars, and all classes of buildings;
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of Car Temperatures.
141-151 WEST 22D ST. Chicago, Ill. — *Write for Catalogue* — 1328 Broadway New York, N. Y.

See the Crank of the
CREAGHEAD DESTINATION SIGN
By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.
CREAGHEAD ENGINEERING CO., CINCINNATI, O.

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

MAN wanted—One who has had full charge of operation of a small street railway property for assistant superintendent of city lines of street railway department. A good opportunity for man who has executive ability and initiative. Applicant should give full particulars, as to qualifications. P-387, Elec. Ry. Journal.

POSITIONS WANTED

GENERAL superintendent of operation of combined light, power, traction and gas property desires change. Competent to take charge of property either as manager or assistant manager. Has made good record in charge of utilities operation and water power development. Can furnish best of references. Personal reasons for desiring change. PW-350, Elec. Ry. Journal, Old Colony Bldg., Chicago.

PRACTICAL master mechanic, 22 years' experience. Up to date in reconstruction of equipment. Can handle men and get results. Experience in one man cars and overhead line work. Best reference. PW-388, Elec. Ry. Journal.

Mechanical Engineers

The Vacuum Oil Co. wishes to increase its Technical Department by the addition of a few high-grade, experienced, Mechanical Engineers.

The available openings call for men having the qualifications listed under one of the following heads:

Mechanical Engineers with executive ability, and several years of practical experience in plant operation.

Mechanical Engineers, thoroughly experienced in the operation and maintenance of Street Railway equipment.

Experienced Engineers, thoroughly familiar with the operation and maintenance of Power Plant and Mill Machinery.

We want men who are above the average. Men who take responsibility. Men of good address. Men who have brains—and use them.

Do not call. Write us, giving a complete outline of your experience and qualifications, age and salary desired.

VACUUM OIL COMPANY
Technical Employment Committee,
61 Broadway, New York City.

FOR SALE

SECOND HAND CARS

trucks and motors

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Phila., Pa.

700 tons new 9 in.

GIRDER RAIL

Penna. Steel Co. Section 228, 107 lb. to the yard. Attractive price upon application. Subject to R. W. Hunt & Company's Inspection. Prompt shipment.

H. M. FOSTER COMPANY
Continental Building, Baltimore, Md.

PAUL STEWART and COMPANY

First National Bank Building
Cincinnati, Ohio Telephone M 2662

Cable Address - Pasco, Cincinnati
Code Western Union 5 Letter-A B C 4th & 5th Edition

A1 Units Immediate Delivery

TURBO ALTERNATOR UNITS

1—10,000 kw. Allis-Chalmers 80% P. F. Condensing Turbo Unit, 60 cyc., 3 ph., 2,300-4,600-11,000 volts, 200 lb. I. S. P., 150-200 degrees superheat. Complete with surface condenser and auxiliaries.
1—6,500 kva. Allis-Chalmers Condensing Turbo Unit, 60 cyc., 3 ph., 2,300 volt. Complete layout, including jet condenser and all auxiliaries.
1—3,000 kw. Westinghouse (actual capacity approx. 4,000 kw.) Condensing Turbo Unit, 60 cyc., 3 ph., 2,300-4,400 v.
1—1,500 kw. Westinghouse *Complete Turbo Alternator Station*, 60 cyc., 3 ph., 2,400 volt, 3,600 r.p.m., including Le Blanc jet condenser, boiler plant and building.
1—2,000 kw. Allis-Chalmers Condensing Turbo Unit (actual capacity approximately 3,000 kw.), 60 cyc., 3 ph., 2,300 volt. Complete with jet ondenser and auxiliaries.
2—1,250 kw. Westinghouse Condensing or Non-Condensing Turbines (actual capacity 1,500-1,800 kw.), 60 cyc., 3 ph., 480, 2,300 or 11,000 volts, 1,200 r.p.m. Complete with Le Blanc condensers.
2—600 kw. Westinghouse Non-Condensing Turbo Units, 60 cyc., 2 or 3 phase, 220-480 or 2,400 volts. Units newly rewound and rebladed.
1—500 kw. Westinghouse Condensing Turbo Unit, 60 cyc., 2 or 3 phase, 2,200 volt, 3,600 r.p.m. Complete with surface condenser.
1—1,000 kw. General Electric-Curtis VERTICAL Condensing Turbo Unit, 60 cyc., 3 ph., 2,300 volt, 1,200 r.p.m. Complete with jet condenser.
1—1,500 kw. General Electric VERTICAL Condensing Turbo (actual capacity 2,200 kw.), 60 cyc., 3 ph., 2,300 v., 900 r.p.m. Complete with surface condenser, piping and all auxiliaries.
1—5,000 kw. General Electric-Curtis Vertical Turbo Unit, 60 cyc., 3 ph., 2,300-4,500 volt, 720 r.p.m. Complete with surface ondenser, piping and all auxiliaries. Complete installation.
1—10,000 kw. General Electric VERTICAL Condensing Turbo Unit, 60 cyc., 3 ph., 6,600-11,000 volt, 720 r.p.m. Complete with surface condenser and auxiliaries.
1—10,000 kw. General Electric VERTICAL CONDENSING Turbo Unit, 25 *cycle*, 3 phase, 6,600 volt. Complete with surface condenser and all auxiliaries.
1—1,500 kw. General Electric VERTICAL Condensing Turbo Unit, 25 *cycle*, 3 phase, 11,000 volts.

DIRECT CURRENT UNITS

1—1,500 kw. Westinghouse Engine Type Generator, 220-250 volt, direct connected to horizontal heavy duty cross compound Corliss engine.
1—1,200 kw. General Electric M. P. Engine Type Generator, 250-500 volts, direct connected to tandem compound heavy duty Corliss engine.
1—800 kw. Same as above.

BOILERS

3—350 hp. Stirling B. & W. Water Tube Boilers. 200-lb. allowance. Without grates or stokers.
4—500 hp. B. & W. Steel Header Water Tube Boilers. 12 tubes wide, 21 tubes high. 200-lb. allowance. Complete with stokers and all fittings.
1—500 hp. Stirling B. & W. Water Tube Boiler. 160-lb. allowance. Complete with stoker and fittings.
1—250 hp. Heinie Steel Header Water Tube Boiler. 150-lb. allowance.

FOR SALE

150 Johnson Registering Fare Boxes

Will accommodate any fare from .01 to .10. Used only 6 months. Perfect condition, guaranteed. Make offer for all or part.

FS-389, Electrical Railway Journal
1570 Old Colony Bldg., Chicago, Ill.

USED CARS

For Every Service

Railway Motors

Standardize Your Equipments at Minimum Cost

TRANSIT EQUIPMENT CO.
501 Fifth Avenue, New York

ROTARY CONVERTERS

1—2200 KW. Westinghouse, 6 phase, 60 cycle, A.C., 600 volt D.C. with speed limit and end play device, speed 450 R.P.M. and 3—900 K.V.A. 13,200/6,600-368 volt transformers and panels complete.

1—500 KW. Westinghouse, 3 phase, 60 cycle, 360 volts A.C., 600 volts D.C., 400 R.P.M. with 2—300 KW. Westinghouse 2,400/380 volt transformers, also switchboard.

2—300 KW. Stanley 3 phase, 25 cycle, 360 volts A.C., 600 volt D.C., speed 500 R.P.M., complete with suitable transformers, also panels.

DIRECT CONNECTED ENGINE UNIT

1—850 KW. Gen. Elec. 575 volt compound wound, 100 R.P.M. generator direct connected to 23 and 54 x 48 Greene Wheelock cross compound heavy duty 4-valve engine, complete with surface condensing equipment and panel, price f.o.b. cars..$7,500

Archer & Baldwin, Inc., 114 Liberty St., New York City
Telephone 4337-4338 Rector

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Compressors
Ingersoll-Rand Co.

Air Motors
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Anchors, Guy
Drew Elec. & Mfg. Co.
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Angle Bar Bolters
Ingersoll-Rand Co.

Armature Shop Tools
Elec. Service Supplies

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cambria Steel Co.
Midvale Steel & Ord. Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones B. & M. Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Bankers and Brokers
Coal & Iron National Bank

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
General Electric Co.
More-Jones Br. & Metal Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Amer. Chain Co., Inc.
Niles-Bement-Pond Co.
Ry. Track-work Co.
Watson-Stillman Co.

Bending Apparatus
Elec. Railway Imp. Co.
Ry. Track-work Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
Cambria Steel Co.
Midvale Steel & Ord. Co.
National Tube Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies
Rail Welding & Bonding Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Imp. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Copper Clad Steel Co.
Drew Elec. & Mfg. Co.
Elec. Railway Imp. Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Ry. Track-work Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, etc.)
Bates Exp. Steel Truss Co.
Creaghead Eng. Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equip. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Hamilton & Hansell, Inc.
Nat'l. Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co
Safety Car Devices Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Tr. Br. Co.

Brooms, Track, Steel and Rattan
Amer. Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse Elec. & M. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Buses, Motor
Brill Co., The J. G.

Bushings
Natl. Fibre & Insulation Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables
(See Wires and Cables)

Carbon Brushes
(See Brushes, Carbon)

Car Lighting Apparatus
Elec. Service Supplies

Car Panel Safety Switches
Westinghouse Elec. & M. Co.

Cars, Dump
Differential Steel Car Co., Inc.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
Midvale Steel & Ord. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Thomas, Perley A.
Wason Mfg. Co.
Witt, Peter

Cars, Second-Hand
Electric Equipment Co.

Car, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
More-Jones Br. & Metal Co.

Castings, Funnel
Wharton, Jr., & Co., Inc., Wm.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
Wharton, Jr., & Co., Inc., Wm.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Electric Service Sup. Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Circuit Breakers
Cutter Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equip. Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. B. Co.

Compressors, Gas
Ingersoll-Rand Co.

Concrete Reinforcing Bars
Cambria Steel Co.
Midvale Steel & Ordnance

Condensers
General Electric Co.
Westinghouse Elec. & M. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Elec. Service Supplies

Controllers or Parts
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord Adjusters
Nat'l Fibre & Insulation Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Sup. Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Sup Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes
Niles-Bement-Pond Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings, Frogs and Switches
Wharton, Jr. & Co., Inc., Wm.

Crossing Signals. (See Signals, Crossing)

Crossings, Track. (See Track, Special Work)

Curtains and Curtain Fixtures
Brill Co., The J. G.
Elec. Service Supplies Co.
Morton Mfg. Co.
St. Louis Car Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Transit Equipment Co.

Destination Signs
Columbia M. W. & M. I. Co.
Creaghead Eng. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors and Shutters, Fireproof
Kinnear Mfg. Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Doors, Steel, Rolling
Kinnear Mfg. Co.

Draft Rigging. (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.

Electrical Wires and Cables
American Elec. Works
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Engel & Hevenor
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Smith & Co., C. E.
Spooner & Merrill
Stone & Webster
Witt, Peter

Engines, Gas, Oil and Steam
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.

Expansion Joints, Track
Wharton, Jr. & Co., Inc., Wm.

Fare Boxes
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Johnson Fare Box Co.
Na'l Ry. Appliance Co.
Ohmer Fare Register Co.

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Cambria Steel Co.
Midvale Steel & Ordnance Co.

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Cleveland Fare Box Co.
Electric Service Sup. Co.
Star Brass Works

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Nat'l Fibre & Insulation Co.
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Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track. (See Track Work)

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General Electric Co.
Westinghouse Elec. & M. Co.
Williams & Co., J. H.

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General Electric Co.

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Power Specialty Co.
Westinghouse Tr. Br. Co.

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General Electric Co.

Gas Producers
Westinghouse Elec. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
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Carnegie Steel Co.
Midvale Steel & Ord. Co.
Standard Steel Works Co.

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Electric Service Sup. Co.
Westinghouse Elec. & M. Co.

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Bemis Car Truck Co.
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Electric Service Sup. Co.
General Electric Co.
Nat'l Ry Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
English Electric Co., Ltd.
General Electric Co.
Westinghouse Elec. & M. Co.

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Greases. (See Lubricants)

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Railway Track-work Co.

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Electric Service Sup. Co.
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Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Sup. Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Sup. Co.
Smith Heater Co., Peter

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Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
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Hose
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Hose, Bridges
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They are uniform in quality

They talk for themselves

W. J. Jeandron
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Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
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Sharp Flanges and Tread Worn Wheels Are Costly

We can furnish a brake shoe for every kind of wheel wear.

They often cause derailments. You can eliminate them and guarantee safe service by equipping your cars with wheel truing brake shoes.

When only outer part of the tread and flange need grinding, ask for this type of brake shoe.

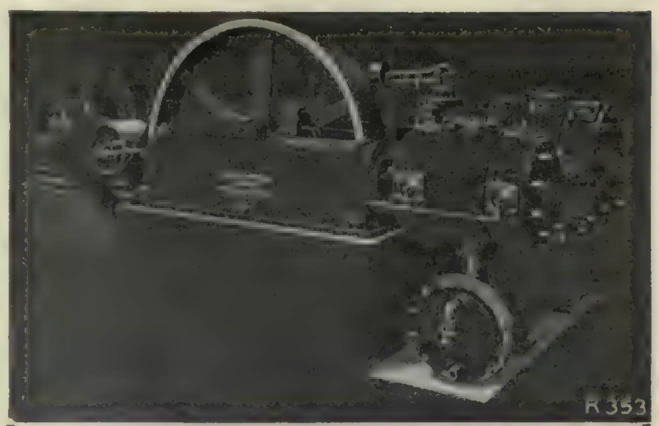
Wheel Truing Brake Shoe Company
Detroit, Michigan
U. S. Trade Mark—Wheel Truing Brake Shoe

Ajax Perfecto Bronze Check Plates

Made from our Perfecto Bronze — the strongest and toughest metal on the market; will bend before it will break. Withstands shocks therefore, and outlasts all other check plates several times.

Specify Ajax Perfecto Bronze on your next requisition.

The Ajax Metal Company
Established 1880
Main Office and Works: **Philadelphia, Pa.**



Graduated Capacity Regulation

Insures Compressor Efficiency at full and partial loads

The 5-Step Clearance Control which regulates the Type "XCB" compressor insures automatic unloading and loading in *five* successive steps.

The compressor operates at *full, three-quarter, one-half, one-quarter and no load,* and efficiently compresses and delivers only the air volume required.

As the same discharge pressure is maintained at all loads, the reduction in power secured with the 5-Step Clearance Control is practically in direct proportion to the reduction in capacity.

Other Type "XCB" features include Ingersoll-Rand Plate Valves for both intake and discharge, enclosed, compact construction, and automatic lubrication. These compressors can be furnished complete with short belt drive attachment and electric motor.

Bulletin 3042

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11 Broadway, New York

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610-C

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National Fibre & Insulation Co.
Westinghouse Elec. & M. Co.

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Amer. Ins. Machinery Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Insulators. (See also Line Material)
Anderson M. Co., A. & J. M.
Creaghead Engineering Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Insulator Pins
Drew Elec. & Mfg. Co.
Electric Service Sup. Co.
Hubbard & Co.

Insurance, Fire
Marsh & McLennan

Inventions Developed and Perfected
Peters & Co., G. D.

Jacks. (See also Cranes, Hoists and Lifts)
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Elec. Service Supplies
National Ry. Appliance Co.
Watson-Stillman Co.

Joints, Rail
Amer. Chain Co., Inc.
Carnegie Steel Co.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

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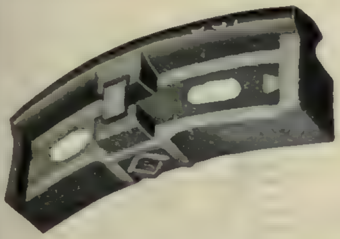

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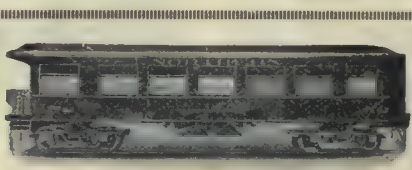
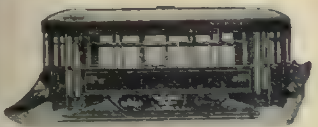

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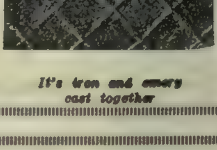

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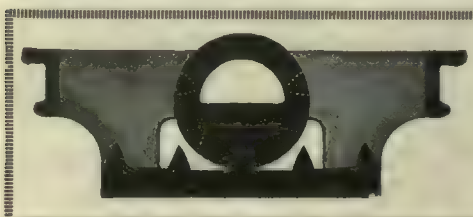

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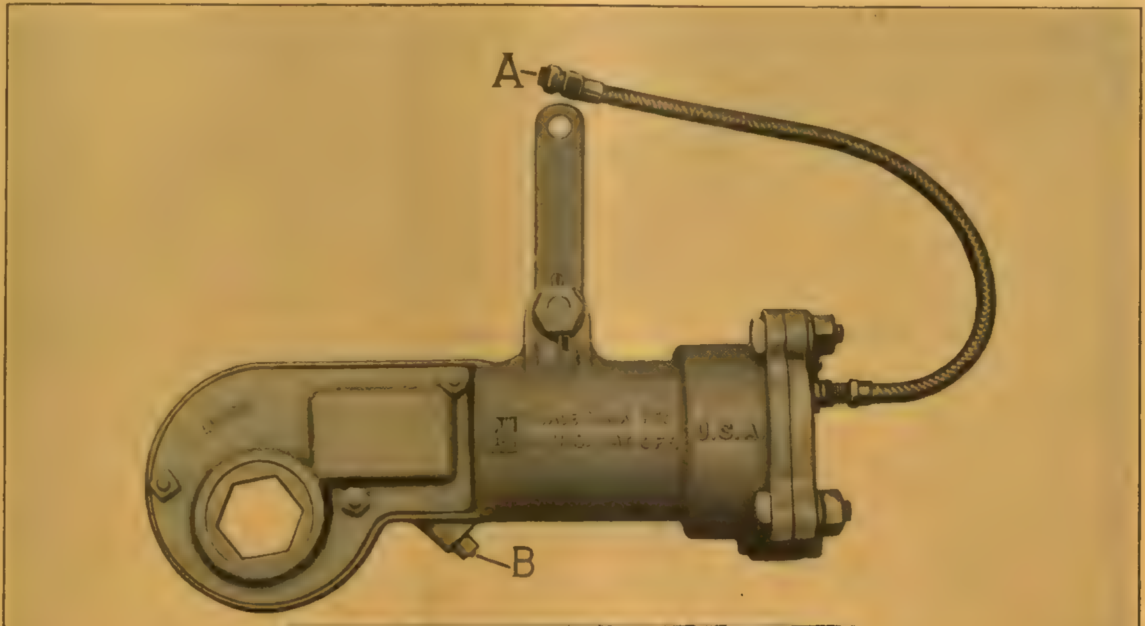

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B—Pawl Release Pin

Patent App. For

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Air Operated

This newly developed slack adjuster will automatically turn the bottom brake rod of Brill 79-E Truck for Safety Cars, and adjust the brake rigging sufficiently to overcome wheel and brake shoe wear.

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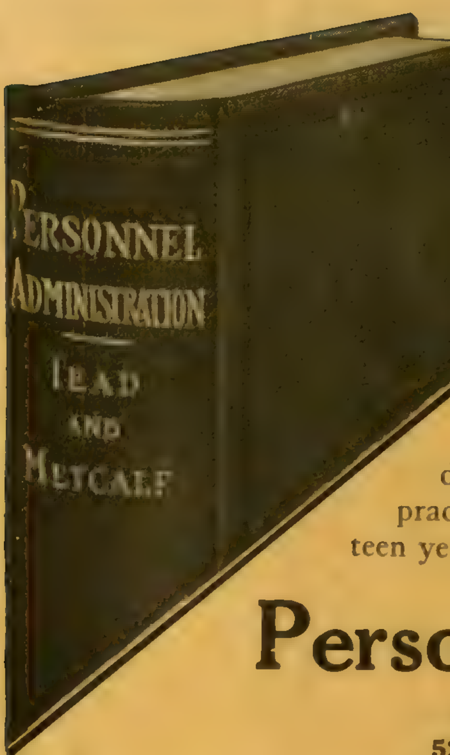

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ELECTRIC RAILWAY JOURNAL

February 11, 1922

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Until passenger transportation is placed on the basis of a monopoly subject to regulation, Public Utility Companies must themselves take the initiative in off-setting unfair competition.

The Republic Knight-Motored Bus has been developed expressly for this purpose. It enables Public Utility Companies to provide supplementary and feeder service to existing railway lines at a profit. Its remarkable efficiency and economy are attracting wide-spread attention in electric railway circles.

Our Public Utilities Division is conferring with many Public Utility Companies and will welcome the opportunity to analyze your problems without obligation.

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REPUBLIC

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Indianapolis
The Stage for The AERA Mid-Winter Meeting

With the prediction of many big business authorities pointing to 1922 as the era for decided industrial improvement, the discussions at the mid-winter meeting on February 28 will be the origin of valuable thoughts on the reconstruction of the railway industry. All operating executives should arrange to attend, because on their leadership depends the future of their properties. This is the opportunity for leaders to confer with other strong men at the very dawn of returning prosperity, already appearing in many localities.

Indianapolis, the growth of which was largely stimulated by its enterprising electric interurban systems, affords the men of the industry a splendid opportunity to see, first-hand, the possibilities of the electric railway for any progressive community, and to witness the extensive part Westinghouse Electrical Equipment has played in community building.

The successful performance of Westinghouse HL Control on the more prominent of these roads has led other operators to adopt it in numerous places throughout the country.

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Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Vol. 59, No. 6 New York, February 11, 1922 *Pages* 223-260

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors **Henry H. Norris, Managing Editor**

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"The Interests of the Subscriber"

"WHAT are the interests of the subscriber?" asked some one who saw this phrase in this column last week, mentioned as the first consideration of the publishers of a business paper.

It is probably quite difficult for the average reader to visualize the editorial, business and manufacturing activities which are necessary to produce the paper he reads—or for him to sense what actuates these departments in their work.

The manner in which *Electric Railway Journal* tries to put this principle into practice is:

To give the subscriber the information and the ideas which will enable him to do his work better, more economically and with greater comfort, satisfaction and profit, and to foster editorially those ideas and methods which will tend to advance the mutual welfare of the subscriber and his industry.

To accomplish these ends the editors are constantly searching for the better and eliminating the poorer. It is never difficult to get "copy." The effort is all directed toward securing the material which is helpful, which represents the best practice, and toward the study of those ideas and methods which should be fostered.

It is for this purpose, so the subscriber may feel that he is getting the best information and ideas, that the editorial staff consists, instead of one editor, of some twelve persons—technical experts in transportation, engineering, equipment, public relations, valuation, and finance, and news editors to sort, edit and interpret the news of the industry—in addition to the special consultants in highly specialized fields.

Each article or idea is examined or sought solely on the principle, "will this help the reader; is it in his interests?" The world is scoured for the best there is.

We want the subscriber to feel, always, that the guiding motive behind every effort we make is in his interests. It is for such service that he pays, and it is only on such service that a publication of high integrity can be built and operated successfully.

Circulation of this Issue, 6,000 **Advertising Index—Alphabetical, 34; Classified, 30, 32; Searchlight Section, 29**

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(AUTOMATIC)
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SAFETY. Eliminate personal danger in coupling cars; cannot separate by accident, while in operation, due to unevenness of track or other cause; coupling remains tight and safe even if lock on one coupler becomes deranged, locks being so designed that one alone is required to prevent uncoupling except in usual manner.

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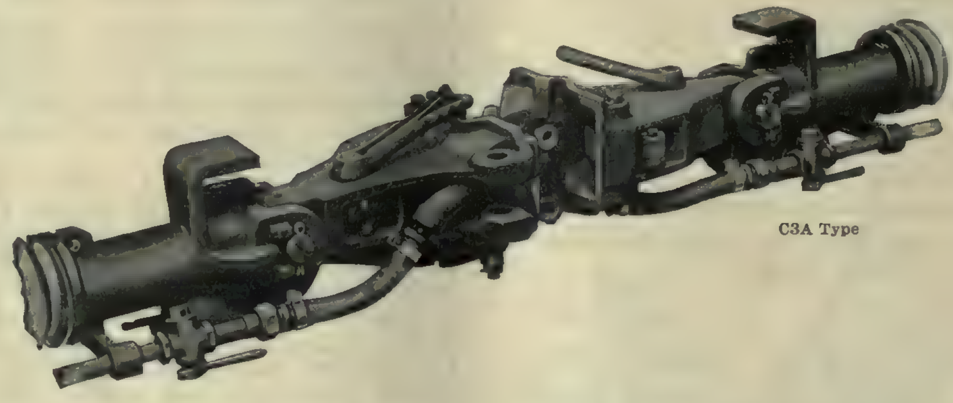

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They were paying a premium on the building and contents, based on the rates charged for a repair shop.

At the recommendation of Marsh & McLennan they built a fire resistive wall, separating the repair shop from the warehouse. The expense was small—the saving in insurance cost was large.

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is laid by 104 companies—
but laid by 104 companies
because it is better track.

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Steel Twin Tie Track

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—pick one up and get busy!

AJAX Electric Arc Welder is the equipment you need to save your track! Don't wait until the rail joints and pieces of special work are so badly battered that they shake and pound your cars to pieces and drive your passengers to the jitneys.

Here is a simple but strong welding outfit, designed and built by men of long experience in the railway track-work field. It weighs only 155 lbs., delivers 333 amperes at 600 volts, and even at 300 volts its output is over 200 amperes—enough to insure a strong solid weld under any conditions. The AJAX is low in first cost, economical to operate and inexpensive to mainain.

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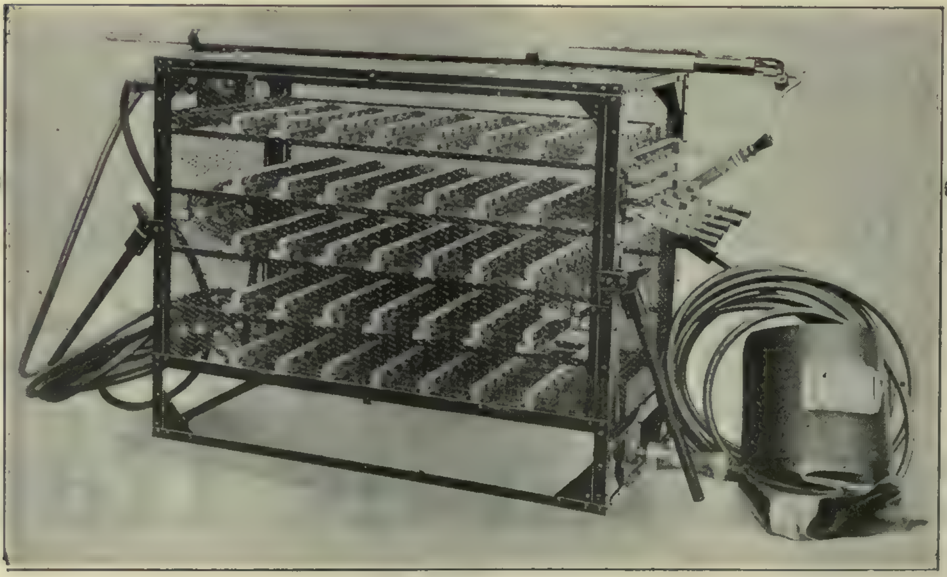

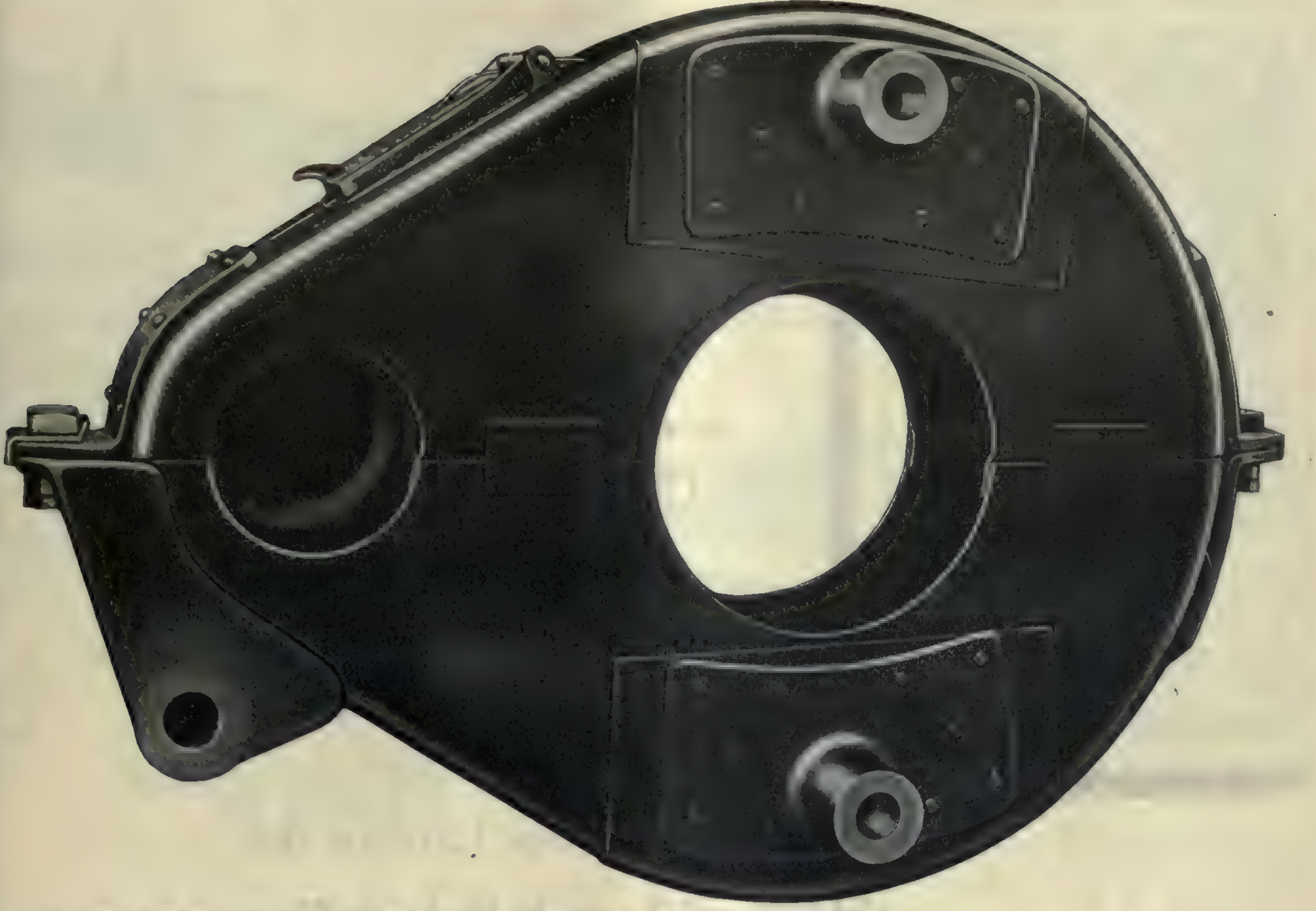

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Strong—Rigid—Durable—Tight

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Write for data sheets.

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Branch Offices: Boston, Scranton, Pittsburgh
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Hydro-Electric Power Commission, Ontario, Can., has recently made available the complete specifications for twenty-five safety cars which were ordered several months ago. As was announced in the "Electric Railway Journal" of Dec. 3, seventeen of these cars are to be used on the Essex division in Windsor, Ont., while the remaining eight will be operated on the Guelph (Ont.) Radial Railway. Following are the details of this equipment:

Number of cars ordered..................25
Name of road.
Hydro-Electric Power Commission, Ontario, Can.
Date order was placed..........Sept. 28, 1921
Date of delivery................Jan. 28, 1922
Builder of car body.
Canadian Brill Company, Preston, Ontario
Type of car.......Single truck, one-man safety
Seating capacity.........................34
Weight:
Car Body.......................12,710 lb.
Trucks ....5,200 lb.
Equipment ....5,590 lb.
Total ....23,500 lb.
Length over all..................30 ft. 3½ in.
Truck wheelbase ....9 ft. 0 in.
Width over all....................8 ft. 4 in.
Height, rail to trolley base........10 ft. 7 5/16 in.
Body material......................All steel

Headlining Agasote

Roof ....Arch type
Equipment:
Air brakes.
Westinghouse A. B. & Safety car control
Armature bearings................Sleeve type
Axles......3¾ x 7-in. Standard Aera No. Ea4
Bumpers................4-in. 5¼-lb. channel
Car signal system..................Ohio Brass
Car trimmings.
Finished in gold bronze throughout
Conduits and junction boxes......Crouse-Hinds
Control...Type D.B. 1 K 4, English Electric Co.
Couplers ....Yoke
Curtain fixtures......National Lock Washer Co.

Curtain material Pantasote

—note these specifications

25 New Cars for the

Hydro-Electric Power Commission
Ontario, Canada

They have

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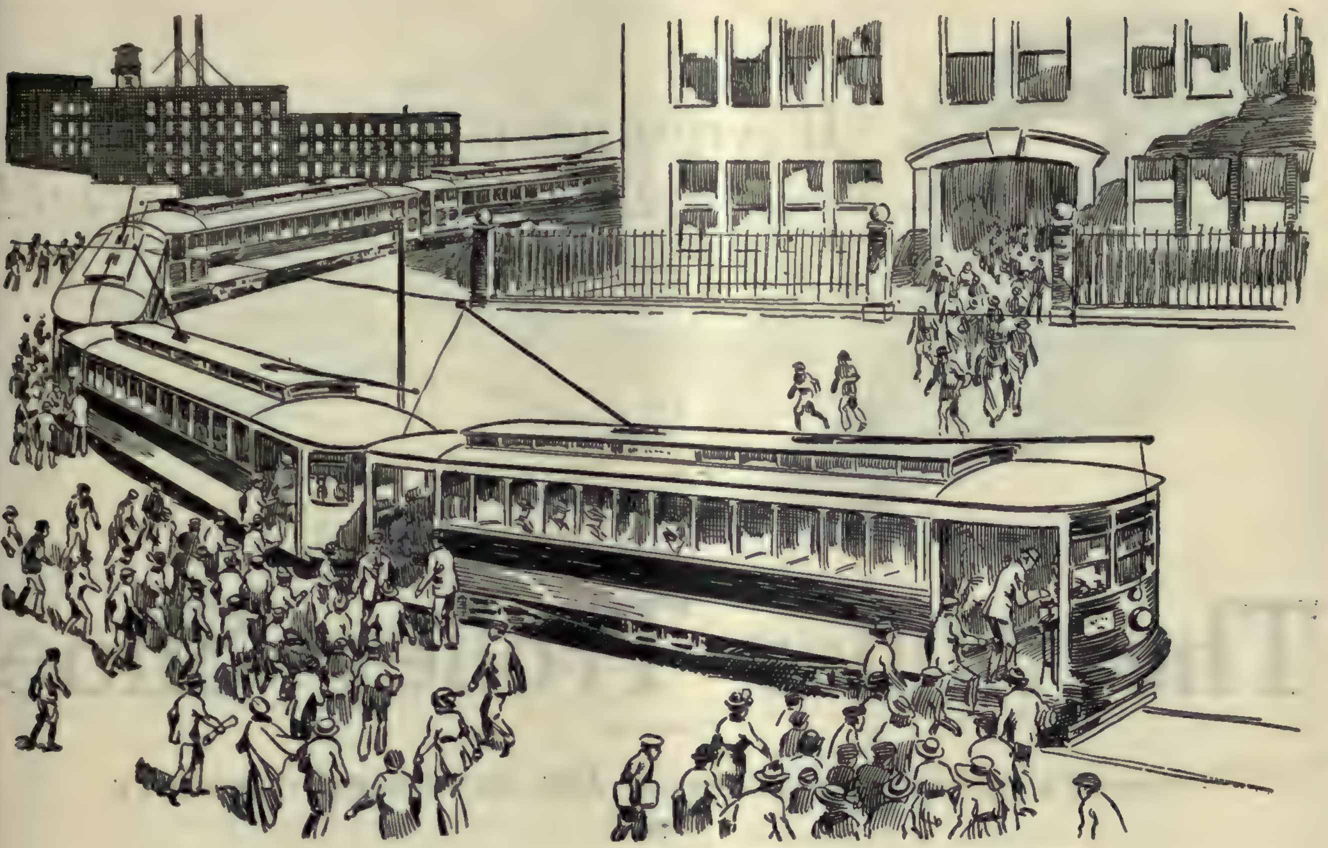

A Car is No Older Than its Passenger-Interchange Speed

Speed in getting over the line isn't secured just because you have plenty of motor capacity on these older, bigger, rush-hour cars.

It's also necessaary to have the right kind of doors of the right width and in the right places, with the right arrangement of aisles and loading spaces.

And it's even more necessary to have these doors and their steps open and close quickly, safely and laborlessly for immediate stops and immediate starts because rush-hour capacity is a matter of split seconds once the cars are in the downtown area.

No need to put your costly investment on the retired list when National Pneumatic Door and Step Control, National Pneumatic Door and Step Operating Mechanisms, Motorman's Signal Lights, Safety Interlocking Door Control and Multiple Unit Door Control will rejuvenate them for so much less than the cost of a new rush-hour car.

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National Pneumatic Company, Inc.
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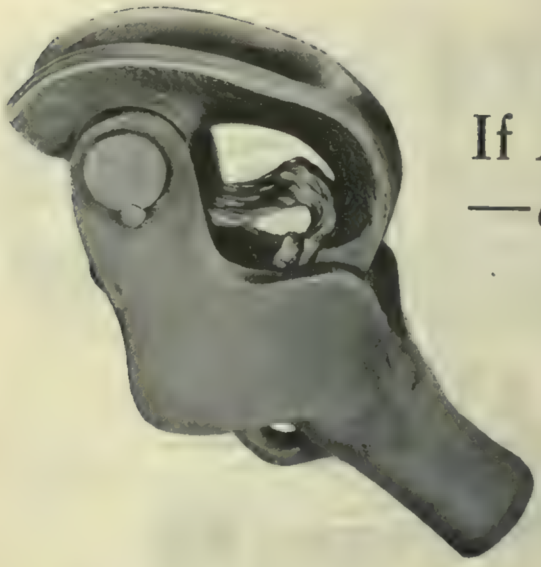
Works: Rahway, N. J.



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The Miller Trolley Shoe
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This Chicago Road Tried One

When the Miller Trolley Shoe was first placed on the market—a practically untried innovation—the officials of the Chicago, North Shore & Milwaukee R.R., believed it had the advantages claimed for it, and they tried it out. Now they're using them on all their big, fast interurban trains, because the Miller Trolley Shoe clings to the wire, avoids delays and line accidents, and because it's actually more economical in terms of *cents per car mile.*

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Boston—21, Mass.

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YOU will remember it! He tried to save money by cutting down on horse feed. Soon the beast got practically nothing to eat.

Then, according to the Frenchman, "When I had taught him to do without oats the fool horse died."

* * *

Now here's a parallel:-

If a man contracts to lubricate the bearings and the gears of a Street Railway System on a basis of so much oil for each thousand miles—

and

If he keeps cutting down the oil allowance more and more—soon you reach the point where it is impossible to assure the useful life of those bearings and gears:

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The total cost of lubrication in the Street Railway Field is only 1/10 of one per cent of the total cost of operation.

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We sell Texaco Street Railway Lubricants to lines operating thousands of cars. More business and renewed contracts speak for the correctness of the Texaco policy.

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1922 OFFERS REAL OPPORTUNITIES to you and to everyone who will adjust himself and his business to the new conditions.

THE PERIOD WE HAVE ENTERED is the time of all times for the man who "knows his business," who is abreast of the times, who is constantly and accurately informed on all the vital problems affecting his industry.

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gives pinions with a comparable longitudinal and transverse strength.

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Columbia Sheet Steel Gear Cases are especially suited to the conditions of Northern Winters where solid chunks of snow and ice pile up between the rails to punish low-hanging parts. A special channel-shaped suspension, heavily reinforced by three thicknesses of metal is provided on our Gear Cases to eliminate breakage at this vital point.

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  Contact Segment Tips
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DUST PROOF and OIL LUBRICATED CENTER PLATES
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  Grid Resistance: Repair Parts
LINE MATERIAL:
  Feeder Ears
  Splicing Ears
  Trolley Ears
MACHINERY:
  Armature Bearing
  Armature Machine
  Armature Buggies
  Armature Lead Flattening Rolls
  Armature Shaft Straightener
  Armature Winding Stands
  Axle Straightener
  Babbitting Moulds
  Banding and Heading Machines
  Bearing Boring Machines
  Car Hoists
  Car Replacers
  Coil Taping Machines
  Coil Winding Machines
  Pinion Pullers, any type
  Pinion Pullers: Repair Parts
  Pit Jack, Pneumatic
  Signal or Target Switches
  Tension Stands
MOTOR SUSPENSION BARS
MOTOR AND TRUCK SPRING CAP CASTINGS
PLOW TERMINALS
POWER STATION: Special attention given to Castings used in Power Stations
RAILWAY MOTOR PARTS:
  Armature Bearing Shells
  Armature Bearings: Bronze
  Axle Bearing Shells: Malleable Iron
  Axle Bearing Shells: Semi-Steel
  Axle Bearings: Bronze
  Armature Coils
  Armature Shafts
  Bolts, Special
  Brushholder Parts
  Brushholders, Complete
  Commutators, All Types
  Dowel Pins
  Field Coil Terminals
  Field Coils
  Gear Cases: Malleable Iron
  Gear Cases: Sheet Steel
  Motor Covers
  Pinion Nuts
  Thrust Collars
RATCHET BRAKE HANDLES: Bronze
  Ratchet Brake Handles: Malleable Iron
THIRD RAIL SHOE BEAM: Repair Parts
THIRD RAIL SHOE BEAMS
TROLLEY CONTACT WASHERS
TROLLEY HARPS
TROLLEY POLES
TROLLEY WHEELS, COLUMBIA:
  Trolley Wheels to Specifications
TRUCK PARTS:
  Brake Pins
  Brake Rigging for All Types of Brakes
  Brakes, for Maximum Traction Trucks
  Coupling Pins
  Equalizers
  Gusset Plates
  Journal Box Covers
  Journal Box Shims
  Journal Boxes
  Journal Brass Wedges
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  Journal Check Plates
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Electric Railway Journal

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Look at the Doughnut, Not at the Hole

IN BOOM times it is perhaps just human nature to look at the doughnut, and in times of depression it is probably just as much human nature to look only at the hole. (Now, some good New Englander must not spoil this discussion by saying that this figure is all wrong because what we are talking about is a "fried cake" or a "cruller" and not a doughnut—every one knows what we mean, anyway.)

This country, as we have all talked about repeatedly, has been through, and is still in, a period of depression which is admittedly severe. *But our future subsistence is not in the hole of the doughnut.* Now is the time to look at the substance and see what we have upon which to subsist.

To explain one evidence of our first figure, in times of depression we always talk about men out of employment, and in boom times how many men are employed. If we reverse the process today, we will note that 85 per cent of the people of the United States are employed and at wages whose real buying power is higher than it has been in twenty-five years. It is this condition which proves that the future, and the immediate future at that, is substantial and sound.

Electric railways and the manufacturers who supply their needs have been as gloomy as the rest of the country; more gloomy at times, as a matter of fact. But today, the railways, almost more than other businesses, should study the substance of the doughnut and not the hole, for there is tangible proof of the solid substance of railway business today. In addition, the general sense of security of the business of the nation as a whole, when the actual positive facts are considered, should indicate a permanence of improved conditions upon which secure business growth may be predicated.

Action Is Urged Against the Tax Exempt Security

THE Oregon Chamber of Commerce recently passed a resolution urging Congress to take the necessary steps to eliminate the tax exempt features from government, state and municipal securities. What is wanted is something to make effective the phrase in the Sixteenth Amendment to the Constitution of the United States which says that Congress shall have power to levy taxes against income "from whatever sources derived."

The effect which the tax exempt security has upon the desirable growth of productive business of the country, particularly regulated business, is very great and very real. But the situation is one in which it is difficult to interest the average citizen and also, apparently, the average Congressman. It will be only by an intense educational campaign that the public will be made to appreciate how the tax exempt security militates against the growth and success of those productive enterprises which make business and opportunity for every one, and also against the growth and successful operation of the public utilities from which this same public desires added service.

Every railway should join directly and actively in this campaign of education. And the arguments must appeal directly to the self-interest of the man addressed. He will not act in such a matter out of pity. It must be brought home to him what it means to him.

The American Electric Railway Association has just circulated the Oregon resolution to its member companies. The resolution is printed elsewhere in these columns also. The association advisedly suggests that member companies, as one step to take in this campaign, urge other chambers of commerce to take similar action. This should be done. Keep active any good move which will help toward the desired end.

The tax exempt security should go! It is bad for American business!

Commissions in Their Relations to the Judiciary

WRITERS on the history of jurisprudence point out that courts of equity were established to bring to the administration of justice remedies not possible, or at least not easily secured, through common law. Men in all times have found difficulty in framing laws so general as aptly to meet every particular act and not fail in some circumstances, and they have therefore sought some tribunal other than the law courts for certain special problems. Originally, equity in England was administered by the ecclesiastics, and it was thought that precedents could have no place in its administration, as the purpose was to judge each case purely on its merits. Although this idea has since been somewhat modified both in England and America, equity practice is still available for those who cannot find in common or statute law the remedies they seek, and the decisions rendered in equity are characterized by a greater degree of discretion on the part of the presiding judge.

Within the last fifteen years still another form of tribunal, so to speak, has been developed in the American body politic, and if the causes for its creation should be traced back, they will be found to be largely the same as those which led to the establishment of courts of equity. These modern new tribunals are the public service commissions, which, under the statutes creating them, have received very broad powers to decide questions which, as with an equity court, call for wide discretion. Many of these questions are not matters of what can be done or what cannot be done under the law. Instead, they relate to what is best for a community from a business, social or engineering standpoint. Thus a commission, in a sense, is a judicial body with power to render decisions as to rates which greatly affect the value of property. At the same time, many of its duties are of a legislative or executive nature, in that it can prescribe ways of carrying out various lines of business, such as methods of accounting and the extent of the services to be rendered. Owing to these somewhat diverse duties, special knowledge of law, engineering or finance is extremely helpful to a commissioner, but as his office is not primarily a legal, financial or engineering one, the commissioner should be more than a lawyer, financier or engineer. There is no doubt that commission rules, when properly administered, can cure many evils not capable of solution by previously existing tribunals or at least not so easily and quickly cured by them. The innovation of their establishment was a daring one, but experience has shown that the conception was sound.

The thoughts outlined above are suggested by a rather severe attack on the idea of commission government in a report recently presented to the New York Legislature by a committee of the judiciary of the state to report on proper amendments to the judiciary article in the New York State Constitution. It may be that commission government is capable of being improved in form, and that it is possible of abuse and evils. This is not surprising in view of the recent creation of commissions.

It should not be forgotten that the legal procedure of the present day is the result of centuries of experience from the time when the court was a tribal chief, at once prosecuting attorney, judge and jury in every case, and sometimes executioner as well. Each successive change as years rolled by in legal procedure to prevent arbitrary or partial decisions, as by the separation of the functions of judge and jury, and the establishment of rules for the admission of evidence, was a gain to civilization. It is obvious that knowledge obtained through such long experience of the best means of administering justice should not lightly be cast aside, even in commission hearings.

Nevertheless, it is not difficult for one to see in the establishment of commissions some of the same purposes which led to the creation of equity courts, and there is no reason why the movement should not be as permanent in the latter as in the earlier case.

Riding Two Horses—or One?

THE only electric railway official in California who gave any indication to the publishers of this paper that he did not approve of the publication of BUS TRANSPORTATION before the paper was issued said that he thought it would be difficult for the editors "to ride two horses at once." By this statement, presumably, he meant he believed it impracticable for them to publish articles and editorials helpful to both bus systems and electric railway systems, because the interests of the two must be antagonistic.

Actually, there should be no antagonism between the two interests. The ELECTRIC RAILWAY JOURNAL is not "trying to ride two horses," but only one, namely, transportation. Or, if there are two, they are a span. There are certain places where the bus is most desirable, others where the electric railway is the logical system to use.

The development of the bus has made possible service over a great many routes which would never support an electric railway. The economy possible when large numbers of cars are operated makes the electric railway far superior to the bus for a great many other cases.

It is to the interest of all that the proper economic position of each transportation agency should be determined, that there be no waste from duplication or the attempt to use either system under conditions notably unsuitable for it. The community served is equally as interested in this matter as the company because it must eventually bear at least a part of the cost of an unsuitable system. Obviously, then, it is most important for all concerned that the development of the newer system should be along such lines that it will most quickly fill the place for which it is best adapted.

This task is the one to which BUS TRANSPORTATION is devoted.

Hobnob with the Actual Patron

WE HAVE said before that it's good business to join in the choruses of the Gyratory Club in your town and otherwise take an active share in the business and civic organizations of the community; but we repeat that fine as this may be it does not get down to the great masses whose purse suits the cars better than the automobile. Our suspicions in that line were confirmed recently when we had the privilege of reading the answers of part-time, no-time and once-upon-a-time car riders to a questionnaire which was sent out by one of those managers who wants always to face the facts.

Like so many others he had seen his traffic drop during these latter months by 10, 20 and 30 per cent. Unlike others, however, he was not content to write the fatalistic words "Industrial depression" on the daily traffic reports and let it go at that. He knew that times were hard, but he also knew that the local lighting company was doing quite as well as the year before and that the live wires of the district were also standing up pretty well. Was there anything in his service or fares that he could remedy to get more travel, more money and more net?

He could not find the answer from anything he saw in the newspapers or was told at the clubs. He's too popular in the first place; and in the second place, most of these friends are too well heeled to worry about car fare or gasoline bills. So he went directly to the workers in shop, store and office with such questions as these: "Where do you work? Where do you live? Do you ride in? Do you ride back? Do you ride home for lunch? Would lower fare help you ride home for lunch? What's wrong with our fares and where? What's wrong with our cars and why?"

It is too soon to give the results of this quiz, but one thing is certain: The management now knows exactly where all the tender spots are and is setting about to remove them—especially in devising fare plans that will give people the increased rides they want to take. In the meantime, the hundreds who answered are feeling better in having got a load of sorrows off of their several chests. When the remedies are announced, also, they will have the rare pleasure of feeling that they had a personal share in securing improvements and so will pay more attention than otherwise to any plan offered.

High-Class Interurban Service in Utah

The Bamberger Electric Railroad, Connecting the Largest Two Cities of Utah, Has an Attractive Route Between Lake and Mountains—With Modern Equipment and High-Class Service, Its Continued Success Is a Natural Result

BY M. L. CUMMINGS, JR.
Utah Power & Light Company, Salt Lake City, Utah

SIMON BAMBERGER, EX-GOVERNOR OF UTAH, AND FOUNDER OF THE BAMBERGER ELECTRIC RAILROAD

THE Bamberger Electric Railroad forms the center link of a chain of three electric interurban railroads and operates between Salt Lake City on the south and Ogden on the north—the largest two cities in Utah. Connecting with the Bamberger on the north is the Utah-Idaho Central, running from Ogden, Utah, to Preston, Idaho, and on the south the Salt Lake & Utah, running from Salt Lake City to Payson, Utah.

Serving directly, as it does, the largest two cities in the state, and along its lines, which cover a distance of approximately 40 miles, one of the richest agricultural sections of the state, the Bamberger road handles a large and ever-increasing amount of passenger and freight traffic.

The Bamberger Electric Railroad takes its name from Simon Bamberger, its founder, who, more than thirty years ago, conceived the idea of constructing a railroad to provide local service between Salt Lake City and Ogden. In spite of considerable opposition and pessimism and dissuasion of his friends, Mr. Bamberger, with practically nothing but his own resources, succeeded in constructing, bit by bit, the so-called "dummy line" (this by reason of the operation of boxed-in steam locomotives) until Ogden was reached in 1908.

Originally incorporated as the Great Salt Lake & Hot Springs Railway, in the very early '90s, it passed through reorganization and became the Salt Lake & Ogden Railway Company, and for many years operated as such. The history of its development is a tribute to the fortitude and genius of Simon Bamberger.

Two years after the completion of the line into Ogden, in May, 1910, the road was electrified, although steam locomotives were continued in freight service only, until the year 1914. The electrification resulted in a marked increase in the traffic and earnings of the road, and the "dummy line" soon became known as the Bamberger line, or the Bamberger Electric, which name was officially adopted on Aug. 14, 1917.

The road is capitalized for $1,500,000, the stock being owned by Simon Bamberger, chairman of the board of directors; his son, Julian M. Bamberger, president and general manager, and their immediate family.

The road serves directly a population of approximately 175,000. Although primarily a passenger line, considerable freight business has been developed during the past few years. This is constantly increasing, and if the company is successful in obtaining the establishment of through rates between its line and the Union Pacific Railroad and its connections the freight revenue will be greatly increased. The company already has joint tariffs with the Denver & Rio Grande Western, the Western Pacific, the Southern Pacific, the Utah-Idaho Central, the Salt Lake & Utah, and to some degree with the Oregon Short Line.

Many industries directly tributary to its lines are served by this road, most of these industries being located at Salt Lake City and Ogden. The intervening territory consists largely of prosperous agricultural communities and flour milling centers and comprises some of the richest fruit lands in Utah. The most important industries served in Salt Lake City and Ogden are classified about as follows: Coal yards, motor car companies, wholesale dry goods companies, warehouses, candy manufacturing companies, sand and gravel companies, lumber companies, wholesale drug companies, oil refineries, State of Utah good roads warehouse, brick manufacturing companies, United States government arsenal, U. S. Government Bureau of Public Roads warehouse, box manufacturing companies, and wholesale grocery houses.

FINANCIAL AND OPERATING STATISTICS

Operating statistics for the years 1919 and 1920, including freight, express and passenger business, are as shown in the table on page 226.

Much care and attention is devoted to the maintaining of rolling stock in first-class condition, and much of the latest type of this class of equipment is now in service on the Bamberger road.

There are fifteen motor cars in passenger service. These were built by the Niles Car Company, Niles, Ohio. Five are combination passenger and baggage and ten passenger cars. These vary in length from 56 to 60 ft., with a capacity of fifty-six passengers for the combination cars and sixty-two to seventy for the

OPERATING DATA, BAMBERGER ELECTRIC RAILROAD

	1919	1920
Passenger car mileage	745,196	1,017,427
Freight, mail and express car mileage	265,597	322,857
Total car mileage	1,010,793	1,340,284
Passenger car-hours	25,875	30,596
Freight, mail and express car-hours	35,287	36,625
Total car-hours	61,162	67,221
Regular fare passengers carried	1,219,290	1,232,833
Total revenue passengers carried	1,219,290	1,232,833
Total passengers carried	1,219,290	1,232,833
Employees and others carried free	81,657	102,341
Passenger revenue	$494,625.15	$550,786.20
Average fare per revenue passenger	0.40403	0.44676
Total revenue from transportation	657,014.03	743,373.82
Revenue from transportation per car-mile	0.65000	0.55464
Revenue from transportation per car-hour	10.74219	11.05865
Total revenue from other railway operations	7,226.94	9,859.22
Revenue from other railway operations per mile	0.00715	0.00736
Revenue from other railway operations per car-hour	0.11816	0.14667
Total operating revenues	$664,240.97	$753,233.04
Operating revenues per car-mile	0.65715	0.56200
Operating revenues per car-hour	$10.86035	$11.20532
Total operating expenses	407,353.33	527,280.63
Operating expenses per car-mile	0.40300	0.39341
Operating expenses per car-hour	6.66024	7.84399

passenger cars. Each of these cars is equipped with four G.E. motors, 125 hp. each, multiple-unit control, Westinghouse combined straight and automatic air valve, one compressor, Baldwin trucks, and 36-in. Standard Steel Works rolled steel wheels; they are electrically heated with Westinghouse heaters. These motor cars, which weigh 41 tons each, are capable of operating at very high speed pulling a single trailer.

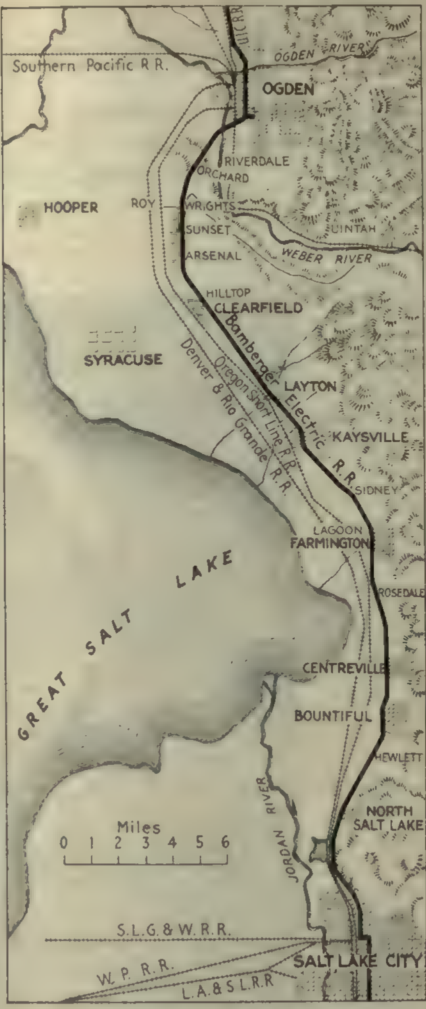
There is a total of seventeen trailers, eleven of which are closed, two are open excursion trailers, and four express and baggage trailers. The average length is 55 to 60 ft.; the weight 27 to 30 tons; and each is equipped with electric heat. They are mounted on Baldwin trucks.

Four electric 42-ton locomotives are in operation, each equipped with four G.E. motors, of 125 hp. each. These have air blower ventilation, multiple-unit control, Westinghouse air brakes, with two compressors; Baldwin trucks and 36-in. rolled steel wheels. Each locomotive can handle a 400-ton train on a 1 per cent grade.

In addition to the above there are forty-eight freight cars, of which thirty-one are box cars, thirteen flat cars, twenty gondola flat bottom, and four combination ballast and beet cars.

The miscellaneous rolling stock equipment consists of one motor line car, one 58-ft. motor baggage and express car, one 42-ft. baggage and express car, fifteen 5-yd. dump construction cars, one caboose, one line car trailer, one tool and wrecking car, one 2½-yd. Marion steam shovel, and one ¾-yd. Thor steam shovel.

The road has a total track mileage of 74.37 miles, the greater part of the distance between Salt Lake and Ogden being double-tracked. The larger portion of the track is laid with 75 and 85-lb. rails. Except for two blocks, International steel ties are used in all pavement, with monolithic concrete construction. The overhead construction is of cross-span type, well braced. In addition to two No. 0000 trolleys, the 750,000-circ.mil copper feeder cable extends the entire length of the line. There are two telephone circuits, one consisting of No. 12 copper and the other of No. 10 iron. The single-track portions of the line are protected by block signals. Feeeder taps are located every 1,000 ft. and a Westinghouse pole-type lightning arrester is installed at each tap.



MAP OF THE BAMBERGER ELECTRIC RAILROAD —THE LAGOON ROUTE—SHOWING HOW IT LIES BETWEEN THE MOUNTAINS AND THE GREAT SALT LAKE

In 1914 an agreement was entered into with the Utah-Idaho Central Railroad, then the Ogden, Logan & Idaho Railroad, for the construction and operation of a joint passenger and freight depot in the heart of the city of Ogden, and in the same block in which the post office is

TYPE OF MOTOR CAR USED BY BAMBERGER ELECTRIC RAILROAD located. This not only serves to reduce the expense of operating the terminal, but develops considerable through business, both freight and passenger, between the interurban lines, as through service is operated through the joint terminal.

In 1914 an arrangement was entered into with the Salt Lake & Utah Railroad for the construction of a joint terminal operated by the Salt Lake Terminal Company at Salt Lake City, 50 per cent of the stock of said company being owned by each of the two interurban lines. The passenger terminal is in the heart of the city of Salt Lake, across the street from the Mormon Temple and Tabernacle, and only one block from the Hotel Utah and Main Street. The Salt Lake Terminal trackage is likewise ideally located for extensive warehouse and industrial development, its trackage being much closer to the business center than either of the competing steam lines; and many valuable industries are being located on this trackage.

In addition to the terminal stations at Salt Lake City and Ogden, depots are maintained at the following stations: North Salt Lake, Bountiful, Centerville, Farmington, Lagoon, Kaysville, Layton, Clearfield, Arsenal.

A well-equipped machine and blacksmith shop and paint and carpenter shops are located at North Salt Lake, and carhouses at Salt Lake and Ogden.

One of the factors which helps maintain the high standard of service is the cleaning and inspecting service. All cars and equipment are inspected at each end of each run, at both Salt Lake City and Ogden. Furthermore, the cars are cleaned, given a sort of "Pullman service" at the same time.

Electric power for the operation of the road and its various other uses is furnished by the Utah Power & Light Company. Substations are located at Ogden, Clearfield, Farmington and North Salt Lake, those at Ogden, Farmington and North Salt Lake being equipped with two 400-kw. G.E. motor-generator sets, and the one at Clearfield having one motor-generator set of the above capacity. These machines are very substantially built, and are capable of sustaining heavy overloads. They are direct-connected, 600-hp., 2,300-volt induction motor to 400-kw. generator, delivering 750 volts direct current.

At Lagoon, a station about 18 miles north of Salt Lake City, is located the famous Lagoon resort. This is a beautiful summer resort and entertains thousands of pleasure seekers during the summer months. Here the seeker of recreation can indulge in swimming, boating, fishing, dancing and various other sports amid surroundings noted for their natural beauty. This resort is served exclusively by the Bamberger Electric Railroad, and during the summer months the company publishes an excursion rate from all points on its line to the resort. It is owned by the railroad company, and consists of a 40-acre park, 9 acres of which is lake for boating and bathing.

TYPE OF ELECTRIC LOCOMOTIVE USED BY BAMBERGER ELECTRIC RAILROAD

ROUTING AND SCHEDULES AND OPERATING ORGANIZATION

The publicity and traffic departments are operated jointly and under the jurisdiction of the general manager. In this department are the traffic manager, soliciting agent and chief clerk.

The operating officials are as follows: Simon Bamberger, chairman of board of directors; Julian M. Bamberger, president and general manager; J. B. Bean, vice-president; E. A. Vail, secretary; W. E. Jones, auditor; R. B. Needham, traffic manager; N. S. Wiltsie, general superintendent.

The method of securing traffic, both passenger and freight, is chiefly by personal solicitation. In connection with the publicity and traffic departments considerable literature is published, such as time-tables, freight schedules, calendars, car cards, etc.

An hourly schedule is maintained between Salt Lake City and Ogden.

TYPE OF OPEN EXCURSION CAR USED BY BAMBERGER ELECTRIC RAILROAD

Passenger rates are on the basis of 2¾ cents per mile for the one-way fare, and 180 per cent of the one-way fare for the round trip. The steam lines' rates in the same territory are 3.6 cents per mile in each direction. The Bamberger Electric Railroad handles practically 95 per cent of the passenger business local to its territory, also this proportion of passenger business between points on its system and points on the Utah-Idaho Central Railroad to and including Preston, Idaho.

An interesting feature in connection with the business of the road is the effect upon traffic by the business activities of the Mormon Church. The headquarters of this religious organization are at Salt Lake City. It has, however, branch organizations and business institutions throughout the states of Utah and Idaho. Twice each year there is held what is known as the General Conference, during which time the members of the Mormon Church, or a large percentage of them, from all sections assemble at Salt Lake City to discuss their church affairs and other matters. The location of the Bamberger road, the territory through which it runs, and its connection with the Utah-Idaho Central Railroad at Ogden enable it to handle the greater portion of this conference travel, which is quite an important factor.

The Bamberger Electric has made no change in its regular basis of passenger fares for a number of years. Under date of Oct. 18, 1918, an application was filed with the Public Utilities Commission for increase in such fares to the basis of the competing steam lines; and after a hearing, a decision was rendered denying such application. Permission was then asked to cancel the company's excursion rates in its tariff and advance student fares from 1 cent to 1½ cents per mile. The commission's decision on this matter, dated May 10, 1921, allowed the road to cancel its excursion rates and to increase student fares from 1 to 1.1 cent per mile.

Freight rates in each instance are identical with the competing steam lines. As previously stated, the Bamberger road is a party to through tariffs with several of the steam roads, but not with others, and the absence of such an arrangement with some of the steam roads is considerable of a handicap. It does, however, handle 90 per cent of the business to industries located on its tracks where through rates are in existence.

View Showing Portion of Track—Showing Also Overhead Construction and Substation

The express business handled over this line is contracted by the American Railway Express Company, the Bamberger Electric handling practically 90 per cent of the local express business within its territory; the company also receives 20 per cent of the transcontinental express business in and out of its territory.

Motor trucks are becoming quite a factor as a competitor in short-haul traffic, due to the fact that a concrete road parallels the line for its entire length, but it is felt this situation will never become serious.

The operation of the Bamberger Electric Railroad furnishes a splendid example of efficiency and courtesy, and the policy of the management of giving to the public every consideration in connection with its excellent service has produced wonderful results. The development of its business has been steady and substantial, in spite of the many drawbacks and the opposition encountered in its earlier days. The road is a most important factor in the bringing together of the people and the business interests of Salt Lake City and Ogden and the building up of the intervening territory.

View of Twenty-fifth Street, Showing Part of the Business Section of Ogden, Utah

Main Street, Salt Lake City, the Southern Terminus of the Railroad

Social Insurance and Transportation Companies

Public Relations Are Bettered by Contented Employees—Co-operation the Keynote in Social Insurance—Types and Methods in Use by Electric Railways Discussed

HUMAN relationship in the utility industry is getting the attention of the executives as never before. The good will of the employees is an asset to the street railways, whose financial success is determined by their popularity with the public. The employee, in the final analysis, represents the company to the public and secures the good or ill will of the patrons.

Any means that will relieve the employee from worry about himself or his family should be considered with interest, because such a condition will make an employee good humored, polite to the public and interested in the company affairs and will result in a minimum labor turnover. A group of polite, experienced and contented employees, therefore, is an asset to the street railway to a degree found in few other industries because of the intimate relations existing between the employees and the patrons.

There are several things that jeopardize the morale of employees, for they realize that accidents may occur in connection with their work, sickness may occur at any time and stop their incomes, death may occur and families suffer privations, old age is always looming up with its potentialities for financial troubles and unemployment may occur due to discontinuance of some lines, jitney competition, strikes or lack of riders. Any street railway employee given to personal worry from any cause is in poor condition to be an apostle to the public or to preach and live the gospel of good will to all men.

What methods are used or available to meet this situation? Insurance education and co-operation are available—insurance to relieve the employee from financial worries, education to aid the employee intelligently to represent the company and co-operation to cement the interest of the employer and the employee in the street railway business.

SOCIAL INSURANCE SHOULD BE CO-OPERATIVE

Heads of electric railway companies are turning their attention to the science of human relations in their industry. The formation of co-operative associations, the purchase of group accident and health and of group life insurance, the publication of a company paper and the institution of company educational courses—all these are encountered frequently and their value is recognized. A complete plan dealing with human relations will use all available methods in a co-ordinated manner.

Insurance to care for the financial hazards to employees is a variable and new business and is handled in many ways by the individual properties. On a purchase basis there are but two methods available to obtain or carry social insurance:

1. Old line insurance.
2. Self-insurance.

Self-insurance may involve a rather complicated system. An individual property may carry all or part of its own insurance, it may be associated with a group of similar properties in a mutual insurance organization or it may carry its own insurance with reinsurance with old line companies through a holding company. On one property, insurance of several types may exist, and the size of the property or the type of hazard also affects the choice of policies.

No standardized treatment of social insurance can be used or should be used, because every railway company has a distinct personnel and peculiar operating conditions. However, there are some fundamental ideas that are pertinent:

1. Social insurance must be "sold" to the employees to function to advantage.
2. Supervision and education are essential to maintain the efficiency of the insurance.
3. Best results from social insurance are obtained when the employees feel they are morally or financially concerned in the insurance. In some cases part payment of premiums by the employees works well, but in other cases insurance has been very successful without financial participation in the premium payments. The specific property with its labor, social and other conditions dictates the methods to be used.

The ideal way to institute social insurance is to make a detailed study of the street railway organization. to determine its financial and operating status, to get the ideas and reactions of the employees and then to call into consultation the heads of the various departments. After explaining the situation and, if possible, getting constructive suggestions from the department heads the types of insurance suitable to the organization and the agency for putting them into effect can be decided upon.

These same department heads, as a result of these conferences, go out among the men and become insurance salesmen to the men and their families. Every employee should be permeated with an understanding of the proposed insurance—why it is carried, how much it costs, who pays for it, and how it will benefit him.

In some cases, due to time elements or labor conditions, the insurance is purchased by the employer and then "sold" to the employees. The fact that some of the employees actually have the policies is a convincing argument to others. After the insurance is placed in effect it must be operated, supervised and changed to conform to changes in the operating conditions or personnel. Educational work, safety first work, athletics, etc., are essential elements in the game if complete success is desired.

ACCIDENT AND HEALTH INSURANCE

Group accident and health insurance is divided into two general classes:

1. Insurance fixed by workmen's compensation laws covering accidents while at work.
2. Insurance covering accidents and illness under all other conditions.

Insurance to cover the requirements of the state compensation laws is very complex because each state has clauses in its law peculiar to its own conditions and industries. Nearly every law is based on the old English clause "Personal injury by accident arising out of and in the course of employment," but many of the laws change or leave out certain of the words, and the courts in all states have not clearly defined the meanings of a phrase like "Occupational Disease" or words like "Accidents" or "Injuries." The amount of compensation also differs and the elapsed time before compensation begins. Some of the laws even class some types of illness as "accidents" and provide compensation.

In certain states the insurance must be carried in a state fund. In other states the insurance can be carried by the railway company, provided it furnishes a bond, while in still other states it can be carried in a mutual, old line or state insurance organization. The law must be complied with at all events, and how much compensation should be given in excess of the legal requirements is a subject for each company to work out for itself.

Group health and accident insurance other than state law requirements is designed to cover liabilities for injury at all times and to provide a sickness benefit. In general a policy provides for a waiting period and only a portion of the regular wages is paid the worker. On an average the workers of the country lose eleven days a year on account of illness. Health campaigns, infirmaries, medical departments and physical examinations help to reduce this period.

There are two methods for handling this insurance:

1. Old line insurance company. Employer pays all or a portion of the premium depending on conditions.
2. Self-insurance. This may take the form of a contingent fund, a mutual organization or an employee benefit association.

Many of the large old line companies will not place policies today if the employees pay all the premiums. It is usual to have the employees pay about 40 per cent and the employer 60 per cent. This plan is followed because the insurance company desires to deal with a responsible party and many employee associations are very unstable. Or again the employees may not get 75 per cent of their number to insure, which is the usual requirement for a master policy.

The rate for policies is fixed only by the occupational hazard and the percentage of females or colored when the policy is made on the basis of each $10 of weekly benefit. If the policy is made on the basis of payroll payments, the yearly charge is determined for each $100 of weekly payroll in the same manner as before with adjustments that consider the fluctuation in the number employed and the waiting period established before indemnity begins. The number insured and the age do not affect the rate and there is no medical examination. In these days of fluctuating wages the flat indemnity policy has worked out best.

The master policy that is issued considers the different classes insured and contains technical details. Classes may be numerous, but it is considered best to make the number a minimum. For example, on street railways:

Class 1—Supervisory force.
Class 2—Crews and shopmen.
Class 3—Section hands and track laborers.

Often one class, for example Class 3 in the example taken, may be omitted to advantage from the policy because the labor is unskilled, the administration of the insurance is expensive, or difficult, or for other reasons that apply to the specific property. It must be kept in mind, however, that insurance reduces labor turnover and unskilled labor is usually the first to leave in an unstable labor market.

An individual certificate is issued each man insured which guarantees the employee the benefits given him under the master policy. This certificate is issued by the insurance company, but is not a policy. It seems advantageous for the company to issue the certificates in its name, then the talk and gossip about how quickly claims are met refers to the employer and not to the insurance company.

A typical policy would have clauses as follows: Coverage for twenty-six weeks or longer, providing indemnity for all injuries not included under workmen's compensation act and for all sickness at a definite figure of say $10 per week indemnity after a period of eight days or for a definite percentage of the payroll, say a maximum of 66 per cent. The employer settles all claims through his own claims organization, subject to general consultation with the insurance company. The cost of such a policy, based on two-thirds compensation for twenty-six weeks, will vary from one to one and one-half per cent of the payroll.

GROUP LIFE INSURANCE

Group life insurance in its simplest form is life insurance issued to an employer for his employees. An executive must have fifty or more workers on his staff before he is eligible for this form of insurance from an old line company. Many of the old line companies co-operate on a joint agreement basis and will take a policy on twenty-five employees at a slightly increased rate, and a certain type of insurance known as "Employees' Insurance" is now available for employers who have more than ten employees. Group life requires no medical examination, fixes no limitation on age, does not consider sex, but does consider color. It specifies that an employee must serve a probationary period before he is entitled to take out insurance. Policies are written on three plans:

1. Flat sum per employee, say $1,000 with a probationary period.
2. A sum based on a year's salary or a percentage of their wage with a probationary period.
3. A sum that varies with length of service.

In general the best plan is that which fixes a sum based on length of service because this method encourages stability and so tends to bring bigger returns on a group life investment.

The smallest amount for which workers are insured is $500 and the largest $5,000, the cost being met by the employer, or by a co-operative plan. If the premium is paid by both, some laws require that 75 per cent of the eligible employees must accept the insurance. As long as the employee continues with the railway company, the insurance remains in force, and he may convert at his own expense to a standard contract without medical examination if he leaves the company.

A clause in a typical policy provides for disability benefits. In case an employee becomes totally and permanently disabled before reaching the age of sixty, he will receive the full amount of his insurance according to one of several plans which he may choose. If death should occur during this period, the remaining installments will be paid to his beneficiary.

The employee names his beneficiary just as he would under an ordinary policy and has the privilege of changing his nominee from time to time as circumstances demand. Under no conditions can the employer be named as the beneficiary.

Group life insurance is sold at rates less than individual life insurance rates because it does not require the expense of medical examination and also eliminates clerical work and overhead charges. A master policy is issued the employer and individual certificates to each employee insured.

The employee likes a full check, the company likes to have every man on duty every day and the insurance company wants a low death rate and also is in a competitive business so that health service and safety first service is a logical and valuable development in group life insurance from the standpoint of the employer, the employee and the insurance company. Free literature and health advice are offered to the policy holders and aid is given to institute and operate the policy efficiently. The cost of group life policies is based on the occupational hazard, the indemnity plan and the weighted age of the employees. It will vary between $8 and $12 per $1,000 indemnity.

The master policy covers the desired classes of employees and eliminates employees not eligible because of the probationary period. The individual premium for each individual at his age and for the amount of indemnity is considered and the sum total of premiums and the sum total of insurance are then determined. These data give the average cost per $1,000 of insurance for that class of employees. Then during the policy year all additional insured are figured on the basis of this average cost.

For the next policy year the process is repeated so that each employee pays a slightly higher rate due to his increase in age, since the group policy is renewable each year at the attained age of the employees. With normal turnovers, however, the premiums remain stationary at the end of about five years. The probationary period is usually placed at three months to ward off "floaters."

Electric railway companies have not neglected group life insurance and the following companies are among those that have bought such insurance: Philadelphia Rapid Transit Company of Philadelphia, International Railway of Buffalo, Knoxville Railway & Light Company, Washington & Old Dominion Railway, Hudson Valley Railway, United Traction Company of Albany, Arkansas Valley Interurban Railway of Wichita, Chattanooga Traction Company, Kingsport Utilities, Inc., Laurel Light & Railway, Lincoln Traction Company, Nashville Railway & Light Company, the Duluth Street Railway and the Denver Tramway.

The primary advantage of group life insurance to the employer is that it furnishes an incentive to the employee to remain with the one organization for a long period and gives the employees self-respect and confidence in the future. It eliminates "passing the hat" after accidents, improves morale and permits older employees to get insurance.

BENEFIT ASSOCIATIONS AND LIFE INSURANCE

Old age pensions, some types of sickness and health benefits and other special welfare activities are taken care of best by means of a co-operative association of employees and the employer. It is true, a company can give life insurance or pensions to its employees, but such a practice is faulty and not customary.

A recent and very interesting development for considering all social insurance is the so-called benefit association. Its operation can be shown best by examples. The United Gas Improvement Company employees formed an association in 1920. Any employee who had been an employee of the company for one month is eligible for membership. The applicant authorizes the auditor of the company to deduct $2 per month from his payroll and to pay it to the treasurer of the association.

In November, 1920, a group life insurance contract was arranged with an insurance company whereby any association member can, upon application, secure a $1,000 life insurance policy with conversion clauses. For this insurance the association charges all policy holders up to thirty-nine years of age ninety cents per month; forty to fifty years of age, $1.25 per month, and increases the charges with a still greater age.

In February, 1921, the association took out a group disability policy with another insurance company whereby, for a base rate of 50 cents a month, applicants can secure benefits of $1 a day covering the first seven days. Additional coverage up to $6 per day may be secured at the base rate per dollar, but if limited to 66 per cent of the wages of the applicant. This insurance is also convertible if the employee leaves the company.

The premium charges for the insurance are deducted from the monthly dues paid by each member of the association and 5 per cent interest is paid on all money in the association savings fund. The three branches of the association in 1921 had members as follows:

Savings fund 1922, life insurance 1,347, disability insurance 675.

The affairs of the association are managed by a board of trustees consisting of the president, vice-president and treasurer of the association and six other members. The expenses for operating the association have been assumed by the United Gas Improvement Company, but the insurance cost is assumed entirely by the members.

On the Philadelphia Rapid Transit lines all employees who have been with the railway company for one year are eligible to membership in a benefit association. Each employee pays $1 per month for dues into the association treasury, and the Philadelphia Rapid Transit Company pays $10,000 per month into the association treasury. Aside from other features, this plan provides for sick, pension and life benefits. One dollar and a half per day is paid in the event of sickness, commencing on the eighth day and continuing for a period not to exceed 100 days in any year. This benefit is in addition to that which is required under the workmen's compensation law.

On the Philadelphia Rapid Transit Company system pensions are given to employees sixty years of age, with a fixed sum of $40 per month for each employee who has been with the company continuously twenty-five years. Life insurance provides that $1,000 be paid in the event of death of any employee, with a provision that if the employee insured, before he is sixty years, should become permanently disabled by accidental injury or disease further payments will not be required and the employee will receive instead, for each $1,000 insurance, either sixty monthly installments of $18, or twenty annual installments of $67.98, or fifteen annual installments of $83.90, or ten annual installments of $214. If the insured dies during the period of disability the remaining installments are paid to the beneficiary as they become due. A further clause in this type of policy is a conversion clause which permits the employee to carry insurance after he leaves the service of the railway company.

The Denver "Brotherhood" is very similar to that of the Philadelphia "Benefit Association" and provides that each member shall pay monthly dues. For insurance against sickness, injury or disability the dues are

$1 per month for members who earn $80 or more, 75 cents per month for those earning between $60 and $80, and 50 cents per month for those earning less than $60 per month.

These dues entitle members to benefits of $10, $7.50, and $5 per week respectively, for the three classes, for 104 weeks as a rule, but unlimited for employees who have been ten years with the company. The benefit begins immediately if the illness lasts fourteen days, otherwise it begins seven days after disability. Death benefits are $1,000, $750, and $500 respectively for the three classes, and are paid for and carried by the railway company for the benefit of its employees.

The Duluth Street Railway gives free life insurance to all employees who have been with the company for one year. The amount of the policy is equal to one year's salary, and is a minimum of $1,000. The Third Avenue Railway Benefit Association, New York City, gives an indemnity of $1,000 per employee in the event of death. In Galveston the benefit association of the street railway company pays $1,000 in the event of death. In case of accidents or illness the benefit association pays $2 per day after the fifth day for a period of 120 days, and then $1 per day for the next sixty days, with $300 as the maximum benefit.

PENSION BONDS

Pension bonds are issued by old line insurance companies to care for employees. These bonds take mortality experience into account in fixing the rate and there is no return in the event of death prior to the age of sixty-five. The cost of the bonds may be met by the employer or in co-operation with the employees. One form of bond provides a guaranteed pension for ten years, beginning at the age of sixty-five, if the bondholder lives to that age and the payment of a pension thereafter as long as he lives. If the bondholder dies before reaching the age of sixty-five the moneys that have been paid for the bond will be returned, without interest, to his beneficiary.

For example, if the bond is $100, at the age of twenty-eight the cost would be $262.80, and if the holder lives until he is sixty-five he would be guaranteed $1,000 in $100 yearly installments for ten years and if death occurs during this period the beneficiary gets the remaining installments. At seventy-five and thereafter until death the $100 yearly payments are made to the original bondholder, but the beneficiary gets no money in case he dies.

The bonds may be for $10, $20, etc., a year, or at a certain percentage of an employee's salary, or after a certain probationary period has been served. The pension will depend, therefore, on the bonds accumulated and the cost of one bond has no relation to the bonds accumulated and the cost of one bond has no relation to the cost of another bond subsequently purchased.

In the railway industry the latest data indicate that about thirty companies have old age pension schemes, while 125 companies have some form of benefit association which pays sickness, accident and death benefits.

Pension bonds are a new development and some firms are inclined to invest the money set aside for this purpose in their own preferred stock or bonds; for example, in the case quoted, $262.80 invested at 6 per cent compound interest for a period of thirty-seven years would amount to about $2,200, and this seems to be a better proposition than the $1,000 available through the straight pension bond.

The labor turnover is not a proper basis for setting aside a fund to meet the liability of the pensioners as they retire; the only safe way is to set aside a sum each year which is sufficient to meet the liabilities.

Another questionable policy is the requirement that an employee remain twenty-five years continuously with the company before he is entitled to a pension. Some companies find it better for the employee and themselves to contribute to a pension fund for ten years, after which the fund may be left to accumulate or may be withdrawn without any penalty to the pensioner. This scheme is based on the argument that an employee who has been ten years with the company will be more loyal and efficient if he continues to work of his own free will rather than being held to his job by the penalty of losing part of his pension if he left.

CONCLUSIONS

Group insurance should be made something over and above the financial cost or recompense in the mind of the worker. It is good business to develop in the worker a personal interest in the railway business, and welfare or educational work that does not imply some effort or sacrifice on the part of the worker is seldom worth while. It should be part of a carefully planned human relations program and should be on a contributory basis to obtain maximum benefit.

As a concrete practical thing in the mind of the worker, a visible asset to the railway employer and a nucleus to weld together the whole organization, social insurance is worth while. Publicity and knowledge of details are the secrets of its success with the worker and with the public and every claim settled should be made a cause for publicity in the railway house organ.

The types of social insurance suited to each railway company must be determined by a study of the specific community and company. This study involves not only a knowledge of insurance but also an intimate knowledge of the specific property.

Ninety-seven Autos and Trucks in Atlanta Fleet

NINETY-SEVEN automobiles and trucks are required in the transportation and patrol service of the Georgia Railway & Power Company, Atlanta, Ga., to meet the demands made upon these two departments for quick action.

These cars range all the way in size and capacity from small Ford roadsters to 5-ton trucks. They are used in transporting materials from one installation to another, from one shop to another, from shop to installation, and from warehouse to shop. They are also used in patrolling the power lines of the company which radiate from the dams at Tallulah Falls and Bull Sluice to many sections and which require constant care and attention to keep them functioning properly.

Some of these trucks are especially equipped for emergency service, such as wrecks and fires, and can go at a moment's notice to pick up or cut wires that endanger the public safety.

Sixteen men are constantly employed to keep these cars in running order and repair.

In the course of a year these cars cover approximately 96,000 miles. They consume about 250 gal. of gasoline per day. Two huge gasoline tanks of 8,000-gal. capacity each have just been installed to assure a sufficient supply of gasoline at all times.

Trackless Transportation Versus Rail Transportation

Each System Has Definite Advantages and Disadvantages—These Are Listed for Trolley, Auto Bus and Trackless Trolley, and Definite Conclusions Are Drawn as to the Field for Which Each Type of Vehicle Is Most Suitable

BY KARL A. SIMMON
Manager Light Traction Division, Westinghouse Electric & Manufacturing Company

THE auto bus and the auto truck have demonstrated, beyond all doubt, that there is a definite field of usefulness for this form of motive power that no other tool or instrument of transportation now known to the art can equal. The problem confronting the engineering and transportation branches of the electric railway industry is largely that of determining, from a practical operating and engineering viewpoint, what is the economical field of operation for the electric railway, the trackless trolley bus and the auto bus.

There are so many important factors involved in this problem that only the high spots may be touched upon in a single article. The principal economic consideration is, what is the best form of transportation for a given community when all factors are given due consideration, such as ultimate cost to the community, including taxes, community development and prosperity? If we assume the community had to pay for all tracks and pavements, cars and power plants (which it really does in one form or other) and take into consideration the use of tracks for distribution of freight as well as passengers, which form of transportation would prove most economical for general use? I am quite sure the answer would be for the average city about 85 per cent would be the electric railway, about 5 per cent the trolley bus and 10 per cent the auto bus.

TROLLEY BUS WITH PACKARD AUTOMOBILE CHASSIS, KUHLMAN BODY AND WESTINGHOUSE MOTORS AND FOOT CONTROL

TYPICAL TROLLEY BUS BUILT BY THE ST. LOUIS CAR COMPANY AND EQUIPPED WITH WESTINGHOUSE MOTORS AND FOOT CONTROL

In some cities the electric railway would justify a higher percentage; in others less.

Next consider the factors that determine the economic use of the "electric railway, track and all," the trolley bus and the auto bus—for simplification leaving out the freight distribution problem.

ADVANTAGES AND DISADVANTAGES OF BUS

First, what are the present limitations and advantages of the auto bus? This method of transportation in one form or other has been in use quite a few years, both in this country and abroad. Three principal developments have made the auto bus possible, namely, the development of the internal combustion engine, the development of smooth pavements and the rubber tire, I might even say the pneumatic tire. Before smooth pavements came into general use we had the horse car. The fundamental reason of the track when horse-drawn cars were used was to provide a smooth, easy running, economical surface for the car. When electric railways came in, the track filled another function—that of providing a return circuit for the electric power.

Hence it is obvious that the auto bus would not today be much of a factor in community transportation were it not for the general development and use of smooth pavements; in other words, smooth pavements are essential for bus transportation. It is also obvious that as soon as auto bus transportation comes into general use communities will impose on transportation companies taxes covering the proportional upkeep of the highways; also, that as time unravels, analytical studies will disclose whether a track laid in smooth pavements as a means of carrying larger concentrated loads is more economical than the smooth pavement capable of carrying heavy loads over its entire width. But assuming that smooth pavements exist, the important advantages of the auto bus for handling transportation are:

1. Cost of power plant, track or roadway and overhead trolley are eliminated; *i.e.*, smooth roadway is furnished by the people.

2. Greater freedom of mobility. They may operate anywhere pavements permit; *i.e.*, routes are not fixed, may be withdrawn if traffic changes, are not materially interfered with in case of blockade at some place, as they may run around obstructions.

3. Ability to supply service economically to undeveloped communities.

Some limitations of the auto bus are:

1. Necessity of smooth pavement.
2. Wholly unsuited for mass transportation.
3. Size of unit limited by highway construction and manual work that can be imposed upon operator.
4. Street congestion increases directly as number of passengers carried.
5. Increased density of traffic does not permit of an appreciable decrease of unit operating cost.
6. Apparent decrease of fuel supply with little likelihood of greater efficiency of the internal combustion engine.

CONSIDERATION OF TRACKLESS TROLLEY

The fact that smooth pavements made the auto bus possible has also made the trackless trolley bus an important factor and one that has promise of more general use than seems to be appreciated. Its advantages are:

1. Cost of track or roadway eliminated; *i.e.*, roadway furnished, built and maintained by people.
2. Centralized efficient power generation.
3. Freedom of mobility compared to rail cars.
4. Ease with which system can be co-ordinated with an existing electric railway system.
5. Reliability of operation.

Among the limitations of the trolley bus, we find:

1. Necessity of a smooth pavement.
2. Wholly unsuited for mass transportation.
3. Size of unit limited by highway.
4. Street congestion increases directly with density of passenger traffic.

THE ELECTRIC RAILWAY, TRACK AND ALL

The electric railway, "track and all," which has charged against its income not only its own track but also 16 or 18 ft. of bus or vehicular roadway, is not merely an accidental development but a system of transportation founded on sound principles. Some of the advantages of the electric railway are:

1. Centralized efficient power generation.
2. Conservation of natural resources.
   (a) Low fuel consumption.
   (b) Long life of vehicles.
3. Economical use of labor.
4. Ability to meet rapidly increasing traffic density with increased efficiency.
5. Economy in handling mass transportation.
6. Reliability of operation in communities where severe winters are encountered.
7. Simplicity and flexibility of operation.
8. Low first cost per passenger.

The limitations of the electric railway may be listed as:

1. First cost of power house, track, transmission and overhead.
2. Cost of investment not justified where light traffic exists even though some service is justified.
3. Existing franchise taxes and other imposts, *i.e.*, paving, sprinkling and sweeping, now expected of electric railways and not imposed on the trolley bus or the auto bus.
4. The 5-cent fare or less is fixed in the people's minds, whereas they are willing to pay 10 cents or more for bus service. For instance, in New York considerable agitation prevails for a 5-cent street car fare and not a word of criticism is heard relative to the 10-cent fare which is charged on the Fifth Avenue bus line in the same city.

MOBILITY, PAVEMENTS AND CONGESTION

There is no question but that of the three forms of transportation the gas-driven vehicle is the most mobile, while the rail car is the most restricted. The mobility of the gas car makes this form of transportation most suitable for handling crowds at unusual points and permits of traffic studies, the development of new territory and economical handling of certain classes of "owl" service. These characteristics of the gas bus, or in fact any self-propelled vehicle, are of importance and must not be lost sight of when comparisons are made between this form of transportation and trolley bus transportation.

From a standpoint of being able to dodge traffic and draw up to the curb, the trolley bus is on a par with the gas bus, and while it has the additional advantage of being able to accelerate quickly, sight must not be lost of the handicap imposed by the use of overhead wires.

Taxation is one of the elements of bus operation that should logically be classed among the items that can be evaluated, but at the present time the true cost or correct taxation for the use of a public highway by a privately owned transportation vehicle has not been determined. Only recently have the highway commissions begun to appreciate the destructive effect of heavily loaded rear axles, and it is apparent that either a radical departure must be made in the construction of roads or else more rigid limitations must be placed on the axle load.

When we consider that the electric railway tracks of today are nothing more than a roadway 4 or 5 in. wide, designed for heavy axle loading, is it any wonder that rear axle bus or truck loads of 12,000 to 14,000 lb. are damaging the present type of street or highway? On the other hand, if the entire road, which may be anywhere from 16 to 40 or 50 ft. wide, is designed to withstand axle loadings comparable with the smaller type of rail cars, is there any reason why the cost of the highway should not be many times the cost of the steel roadway which is only 4 or 5 in. wide? It has been said that after a certain relatively light rear axle loading is exceeded the cost of the highway increases more or less as the square of the axle loadings. The present cost of highways (to say nothing of improved construction that may be necessary with vehicles weighing 16,000 to 18,000 lb.) certainly precludes the building of a surfaced road merely as a means of handling passenger transportation with buses. If more substantial highways are to be built in order to care for the heavy as well as the light forms of transportation, it is naturally only a matter of time until the heavy vehicles, which form only a relatively small percentage of the total use of the road, must be called upon to pay a large percentage of the constructional and up-keep costs.

Rail-less operation, whether accomplished through the agency of a storage battery, an overhead trolley or a prime mover (such as a steam or a gasoline engine), is bound to result in greater interference with the other forms of traffic on the street per passenger transported than the car which must follow a fixed pair of rails. It is true that buses, and in general self-propelled or horse-drawn vehicles, can dodge a certain amount of congestion. However, the very fact that the car on rails must follow a certain definite path and not dodge in and out between traffic results in its causing a minimum interference to vehicular traffic. Again, the larger the unit the less the amount of intersectional interference. This is, of course, most important where the density of traffic requires close headway during the rush hour, though it must be remembered in this connection that as the headway is decreased a condition is being encountered where buses are uneconomically operated and should give way to rail operation.

It is obvious that at the same schedule speed rail-less cars involve a greater accident liability than rail cars. The major portion of this liability is chargeable to the necessity of steering the vehicle. However, in addition the rail-less vehicle is continually being subjected to a certain risk imposed by other drivers of rail-less vehicles. Accidents of this description are probably more numerous with the bus than with the rail car, due to a certain respect paid to the rail car.

There is a certain indescribable something that seems to entice some to ride the bus merely because it is a bus. Possibly the railway industry's past sins or lack of merchandising its product is partially to blame; again, also, there seems to be a class which enjoys riding on a street which is void of rails, even though the bus with solid rubber tires may be a rougher riding vehicle than the rail car. A certain amount of upholstery seems to liken the sensation in some way to that of the pleasure vehicle. The bus renders a real convenience to the rider in stopping at the curb, although this service may be limited to summer operation in many localities. It should also be borne in mind that the bus service is subject to interruptions chargeable to climatic conditions.

There are certain characteristics in the construction of a bus which materially affect its reliability of operation as compared to the reliability of a rail car. In the case of a gasoline propelled bus for economy's sake there is but a single prime mover. Failure of this element puts the bus "out of commission." Accelerations and quite a percentage of the running involve the proper functioning of such auxiliaries as a magnet, a clutch and several sets of gears. The truck or chassis of the bus must be constructed so as to take care of irregularities of the roadway. This requires features of construction not included in rail cars. The steering of a bus necessitates an axle construction which is inherently inferior and more liable to give trouble than the solid axle of the rail car. The gas-driven vehicle also presents certain lubrication, ignition and valve mechanism problems not common to either the rail car or the trolley bus. From the standpoint of seat miles delivered, it is obvious that the rail car is the most reliable, with the trolley bus falling somewhere between the two—probably very close to the rail car, were it not for the handicap of the current-collecting device.

COMPLICATION OF MECHANISMS COMPARED

While it is not feasible to measure in dollars the advantage of an electric railway system adopting electric bus operation instead of gas bus operation, on account of the greater similarity of operation, there are certain advantages which must be weighed. In the first place the organization of the electric railway is well fitted to care for the overhead equipment and the propulsion equipment involved in trolley bus operation. The personnel of the shops and inspection department are well acquainted with the propulsion apparatus of the bus and need no special training, as is the case when gasoline buses are operated by an electric railway organization. The present trend of development indicates that there is going to be a material advantage in having certain parts of the trolley bus equipment interchangeable with the present accepted equipment now employed on electrically operated rail cars.

The operation of the rail car today is comparatively simple, taking for example the safety car. There is one handle or lever which controls the slowing and stopping of the car and the manipulation of the doors. The car has a high rate of acceleration or retardation, provides for graduated brake applications, yet permits of a very high rate of braking in case of emergency and provides for an interlocking of the doors, the brakes and the propelling power.

In the case of the gasoline bus of today, we are confronted with a foot service brake, a hand emergency brake, a gear shifting lever, a foot or hand operated throttle, possible necessity of ignition adjustment, a door operating lever and, in addition to all of these, a manually operated steering mechanism.

In the case of the trolley bus, we have a pedal for the control of the propulsion equipment, a foot operated service brake, a hand operated emergency brake, a door operating lever and a manually operated steering mechanism. The simplicity of control of the rail car is apparent. The trolley bus manipulation is more complicated, primarily due to the steering of the vehicle—the gas bus being the most difficult of the three to operate, and therefore requires a more extensive training of platform labor.

The good old street car, "track and all," presents inherent advantages not common to any form of bus operation whether of the electric or gas type. An electrically operated rail system permits of caring for light service with small single-truck cars, and then, as the density of traffic increases, permits of closer headway with better economy, following which double-truck cars, possibly of a one-man-two-man type, can be operated. Then successive economical steps of two or three car trains can be employed. A continued increase in the density of traffic cared for by any form of bus operation soon involves an uneconomical condition due to the inherent limitation in the size of the vehicle and the inefficient use of platform labor. As the density of traffic increases a certain point is reached, where, on account of the greater efficiency of the electrically propelled bus, its operation can be more advantageously expanded than gas bus transportation.

COMPARISON ON A FINANCIAL BASIS

Among the elements which can be equated with a reasonable degree of accuracy on a dollar value basis we find:

(a) First cost of vehicle.
(b) First cost of overhead and structures.
(c) Depreciation.
(d) Maintenance of running gear, propulsion equipment, and vehicle body.
(e) Maintenance of overhead and structures.
(f) Cost of fuel or power.
(g) Cost of conducting transportation.

In considering the first cost of the rail-less vehicle it has been the tendency to make estimates on the basis of a vehicle varying from $7,000 to $8,000—the vehicle to seat anywhere from twenty-eight to thirty passengers. The vehicle cost, and more particularly the chassis and motive power cost, can vary over quite a large range. For instance, in the case of a trolley bus one, two or four motors may be employed. There may be a direct drive, chain drive, chain and gear drive, a single motor direct drive without differential gearing, or a propeller shaft and differential drive. Up to the present the tendency has been to employ two railway motors connected in tandem driving a standard rear axle assembly through a propeller shaft. There is considerable virtue in this construction, employing the maximum amount of standard automotive parts which are manufactured quite economically on a quantity basis.

The capacity of the vehicle has a direct bearing on the first cost, and in the past there has been a great tendency to make direct comparisons between the gas bus or the trolley bus, seating twenty-eight to thirty people with standing room for fifteen or twenty more, and the single-end safety car which seats thirty-five people and provides standing room for about thirty additional passengers.

The bus, whether of the gas or the electric type, seems to fit in best as a feeder and for light traffic sections which do not warrant the laying of rails, and on this basis there is considerable doubt as to the most economical trolley bus capacity.

Cost of overhead and structures is pretty well known, especially as applied to the street railway industry. However, when it comes to the trolley bus, the overhead construction is of considerable importance. In the first place experience to date indicates the necessity of providing two contact wires for each direction of operation, especially if we start out on the premise that one-man operation is to be employed. Also, arrangements must be made so that the cars can be looped at the end of the line, whether by running around a square or by turning on a small loop, so that a single operator can turn the vehicle around without leaving the operating position.

THE TROLLEY BUS AND ITS COST OF OPERATION

As a rule the logical trolley bus applications are somewhat remote from an existing carhouse, and some auxiliary method must be provided for operating trolley buses over the rail route to the carhouse. Where a grooved rail is used, it may be advisable to operate a rail shoe on the trolley bus as a means of taking it to and from its operating zone. However, in many instances it may be necessary to install a second overhead contact wire, normally at 600 volts potential, with an automatic means for transferring this wire to ground potential when the trolley bus is operating in the rail car zone.

The use of a double overhead contact system between the carhouse and the trolley bus zone may also be necessary to accommodate the use of a single pole current collector. Much development work has been done both in this country and abroad in connection with current collection devices, and while it is feasible to operate satisfactorily with two separate standard trolley bases, long poles and swivel harps, a single pole collector has certain desirable points in its favor. Among these are reduction in weight, less liability of current collector damaging the overhead circuit and less liability of short circuits.

Depreciation of the various forms of vehicles now employed is pretty well established and if the trolley bus is assumed as having an economical life of from six to eight years, applications made on this basis will probably not depart far from the actual.

The maintenance of the vehicle as a whole, which involves three elements, *i.e.*, the maintenance of the chassis, maintenance of the propulsion equipment and the maintenance of the body, is something that should be carefully scrutinized and caution exercised to see that ample allowance is made. Chassis repairs and up-keep can logically be based on past automotive data. The propulsion equipment where more or less standard railway motors are employed should be less than the corresponding figures for rail cars, since the motor or motors may be spring-borne and not nearly so rigidly connected to the driving axle as they are when supported directly on the axle transmitting their torque through comparatively large rugged gears. The up-keep of the trolley bus or gas bus body should logically be considerably higher than the up-keep of a body of the same size operated on a rail car where a much smoother roadbed is encountered.

The tractive effort required to propel a rubber-tired bus varies over quite an appreciable range due to such variables as type and condition of road, type and condition of tires, weight per wheel, type of drive, etc. It is not uncommon for the tractive effort per ton required to propel a rubber-tired vehicle to be three or four times as great as that required to roll a rail car having steel wheels. However, it is reasonable to asssume that under average conditions with a good road available (and such is believed to be essential for trolley bus operation) the power consumption for a 10,000-lb. vehicle will at least be equal to the power consumption of the safety car, making the same schedule speed and weighing 16,000 to 17,000 lb.

In the Sept. 10, 1921, issue of the ELECTRIC RAILWAY JOURNAL there appeared a short article on trolley bus operation which included the following data compiled by the writer relative to cost of operation:

COST PER BUS MILE OF TROLLEY BUS

Cost of conducting transportation	7.3 cents
Cost of power	2.5 cents
Maintenance of vehicle	5.0 cents
Maintenance of way and structures	1.05 cents
General and miscellaneous expense	4.0 cents
Road tax	1.0 cent

The total operating and fixed costs per bus mile on a typical service involving a fifteen-minute headway with buses weighing approximately 10,000 lb. was stated to be 24 cents, and on the same basis of calculation the gas-propelled bus shows a total cost per mile of 33 cents.

Although these figures were made some little time ago, additional data indicate that the total operating cost for the economical field of the trolley bus operation very closely approximates former calculations.

The application of rail-less service by the electric railway not only warrants a detailed cost analysis but also the answering of such questions as:

1. How long will the free use of existing paved streets or highways be permitted?

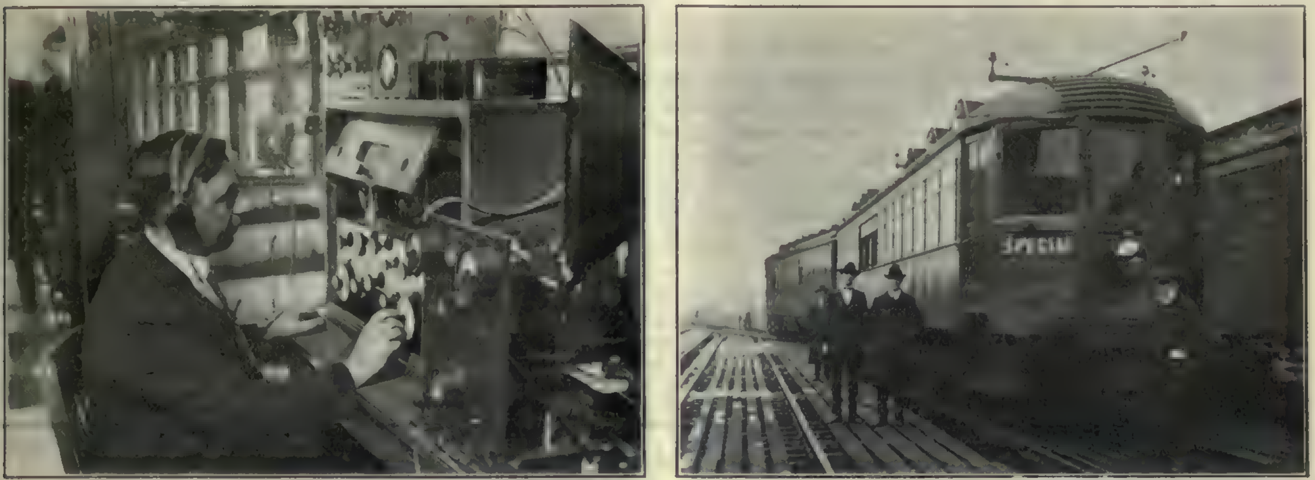
2. How much will the price of gasoline and rubber tires increase in the next three to five years.

3. Will gas bus operation fit in with present rail operation from the standpoint of shop equipment and personnel?

4. Are two contact wires necessary for each direction of operation?

5. On the basis of equal economy of operation of the trolley bus and the gas bus, which type of transportation is best suited from the merchandising standpoint?

After all points involved are taken into consideration, it is quite clear to many that continued development and use of the electric railway, "track and all," is the best solution for our transportation problem, making such use of the trolley bus and auto buses as their limitations will economically permit.



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AT LEFT, RADIO OPERATOR ON NORTH SHORE LINE TUNING HIS EQUIPMENT
AT RIGHT, TRAIN EXPERIMENTALLY EQUIPPED FOR RADIO SERVICE

North Shore Line Experiments with Radio Telephone

THE Chicago, North Shore & Milwaukee Railroad is conducting experiments with wireless telephone apparatus on one of its trains. The accompanying illustrations show how the apparatus appears as at present installed.

In the experimental work so far it has been possible to pick up grand opera at any point on the road and to transmit from the car by radio telephone up to but not exceeding 15 miles.

At present a new radio set is being designed and will be tried out shortly. There are technical difficulties involved in telephoning to and from a steel car, but these are in process of being overcome.

These experiments are in line with the consistent efforts of the management of the North Shore Road to make travel on its line interesting as well as speedy and safe.

One-Man Cars Have Lower Accident Record than Two-Man Cars

INTERESTING data are given in regard to the relative accident record of one-man and two-man cars in some figures compiled by Stone & Webster from the thirteen street railway companies under the management of that organization which operated both one- and two-man cars during the year 1921. It will be seen that the one-man cars are superior to the two-man cars as regards accidents from every viewpoint.

COMPARISON OF ONE-MAN AND TWO-MAN CARS ON STONE & WEBSTER COMPANIES DURING 1921

Number of Companies—13*

	One-Man Cars	Two-Man Cars
Car miles operated	18,022,899	13,868,097
Passengers carried (including transfers)	95,198,971	98,952,902
Number of accidents:		
Total	6,852	7,981
Per 10,000 car miles	3.80	5.76
Per 100,000 passengers	7.70	8.11
Cost of accidents:		
Total	$235,140	$258,346
Per 100,000 car miles	1,304	1,863
Per 1,000,000 passengers	2,350	2,610
Accidents with important injuries:		
Total number	512	805
Number per 100,000 car miles	2.84	5.81
Number per 1,000,000 passengers	5.38	8.13
Accidents with trivial injuries:		
Total number	860	1,448
Number per 100,000 car miles	4.77	10.45
Number per 1,000,000 passengers	9.03	14.62

* Eight companies omitted because their operation, being entirely with one type of car, does not offer comparative figures.

With regard to the eight companies under the Stone & Webster management omitted from the classification, four of these are entirely one-man operated, thus furnishing no comparative figures, and the other four have been prevented so far from installing one-man cars only by financial conditions. It is expected to inaugurate one-man car service with these some time during 1922.

Letters to the Editors

Standardize First the Parts that Wear Out!

PITTSBURGH RAILWAYS COMPANY
PITTSBURGH, PA., Feb. 8, 1922.

To the Editors:

I have read with much interest the discussion between our good friends Mr. Palmer and Mr. Gove regarding a slight change in a one-man type of car, namely, the adding of an exit door way.

In my estimation Mr. Palmer is right.

Most city cars of whatever type will operate in level territory at about 20 m.p.h., but so much time is lost in picking up and discharging passengers, in stops for safety and other delays, that the average car speed is above 9 or 10 m.p.h. in few large cities.

One-half the time, therefore, is lost because of these delays.

Street railway men ought to spend their efforts in eliminating as much of this lost time as possible.

Mr. Palmer without question is correct when he and his associates make changes in so-called existing standards that will in any way expedite car movement.

In this day and age quick service is more important than ever before, since we are losing much traffic to faster moving vehicles. We can accomplish more in "merchandising transportation" by increasing the speed of cars than in any other way; and if by the use of two doors Baltimore can cut down the length of time that its cars stand still, even at a few stops per trip, the change should be made.

Mr. Gove's ideas as to standardization are very unusual. He would standardize the whole before he would tackle the details. This sort of standardization is the sickness that grips the mechanical end of the industry at the present time. The cars of many companies look alike and are of approximately the same size, but unless they happen to have been built by the same car company the parts are not duplicates, and when some part breaks or wears out it will be ordered "as per sample" or by pattern number and will be ordered from the car company that built the car. I am told that this condition applies to the one-man car just as it has always applied to cars built years ago.

If a few of the larger street railway companies should appoint a real standardization committee and start in by studying the store room shelves of the various companies with the end in view of standardizing the things worn out every year, instead of wasting effort in an attempt at standardizing the car body, which is purchased once every twenty or twenty-five years, real progress would be made.

With motors of approximately the same horsepower, axle bearings, armature bearings, brushes, commutators, armature coils, pinions, pinion nuts, armature shafts, etc., are the things which wear out and are the things which should be easily and quickly duplicated.

The wearing parts of trucks have received much attention and are fairly well standardized now, but the castings and parts that break are still ordered usually by pattern number from the one company which originally built the truck.

We might study the store room shelves that hold the glass, seat castings, car trimmings, sash fixtures, sign curtains, sign and curtain rollers, etc., as a real start toward car body standardization.

Most of the large street railway companies already are doing a great deal to cut down the number of parts carried in their store rooms. What is needed is a coordination of the efforts of the store room and mechanical men of the larger roads and the use of existing standard parts when a new car is built, as far as possible.

While it is of advantage to the car builder to have on his shelves for quick shipment a standard car, yet the larger street railway companies had better spend a little more money for their cars (which, after all, are purchased only every twenty to twenty-five years) than to build an addition to their store rooms or even purchase a car that is not the last word in attracting traffic or handling it safely and expeditiously.

P. N. JONES,
General Manager for Receivers.

*Reflection of the California Resolution**

MILWAUKEE, WIS., Jan. 31, 1922.

To the Editors:

The Wisconsin Electrical Association, of which the writer is president, has received a copy of a resolution passed by the California Electric Railway Association and protesting against the publication of BUS TRANSPORTATION by the ELECTRIC RAILWAY JOURNAL.

While not attempting to speak for our association, but as an officer, charged with the operation of street and interurban railways, of several companies, I feel that the publication of this journal by your interests insures the dissemination of correct information about the bus and its possibilities. We all want the truth, and if it can be shown that bus transportation is better and cheaper than the transportation now afforded by street and interurban lines, it is only a question of time until such bus transportation will supplant electric transportation. In my judgment the bus cannot and will not supplant electric transportation, but there will be a great many publications which will attempt to prove that it can and will supplant electric transportation.

I am glad that the ELECTRIC RAILWAY JOURNAL has taken up the work, and feel that through it correct information will be published. J. P. PULLIAM.

[The above is but one of many expressions received during the last ten days by the editors of this paper approving the publication of BUS TRANSPORTATION. The editors sincerely appreciate this support. They also hope that the restatement of the position of the paper, given in the JOURNAL last week, will convince all doubters, if any remain, of the wisdom of starting BUS TRANSPORTATION.—EDS.]

Electrification of Manufacturing Industries Versus Railroads

NEW YORK CITY, Feb. 9, 1922.

To the Editors:

In your editorial comment in the issue of Jan. 28, 1922, entitled "What Forces Are Potent in Shaping Railroad Electrification Progress?" the statement is made that "The railroads are using up the country's fuel at such a rate as to alarm every one who is responsive to data."

The recently issued report of the Superpower Survey shows that by proper application of electric power to manufacturing industries the amount of coal that can be saved is double that claimed possible by railroad electrification. It is also shown that this would require an investment of $185,000,000 to provide the motor equipment necessary to receive and use this power, whereas the amount of capital stated in the report as necessary for railroad electrification is $570,000,000.

Does it not seem that the propaganda for railroad electrification conducted by the electrical manufacturing interests has suggested the statement quoted above?

Not long ago I read in one of the New York daily papers that Secretary Hoover had suggested that some means be found by which some of the idle vessels of the United States Shipping Board be chartered at low rates to coal exporters in order that the coal export trade of the United States might be stimulated.

Why then this support to the idea that the railroads are using up the country's fuel at an alarming rate?

Is not the technical press of the country in a position to supply its readers with information that may not be misleading? EUGENE BETTS,
Electrical Engineer.

[The only propaganda in which this paper is interested is that which is designed to give the country better transportation service of all kinds. No effort has been spared, or will be spared, to secure data that will be accurate and useful to the transportation companies. —EDS.]

The American Engineering Standards Committee reports that there are now national standardizing bodies in the following fourteen countries: Austria, Belgium, Canada, Czechoslovakia, France, Germany, Great Britain, Holland, Italy, Japan, Norway, Sweden, Switzerland and the United States.

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*See ELECTRIC RAILWAY JOURNAL, Feb. 4, page 181.

One-Man Cars and Buses Prove a Live Subject

New England Street Railway Club Hears a Report and General Discussion —Railways Are Urged to Consider the Use of All Types of Vehicles as Part of a Co-ordinated System

THE Feb. 2 meeting of the New England Street Railway Club, which was held at the Copley-Plaza Hotel, Boston, was devoted to a discussion of the development of the one-man car, the motor bus and the trackless trolley. The meeting was the largest held for some time, there being 176 present, which reflected the interest among railway men that is being taken at present in this subject. Edward Dana, president of the association, presided and after an address by Robert I. Todd, president of the American Electric Railway Association, and the presentation of the report of the committee, which is given elsewhere in this issue, the meeting was addressed by others interested in the subject.

In his remarks Mr. Todd said:

"In the midst of electric railway activities in the Middle West, my mind many times turns to New England where I spent some very pleasant and interesting years in the electric railway business.

"Fifteen years of active service, in the direction, management and development of street and interurban railways in the Middle West have been most interesting and eventful. During that period I have witnessed the marvelous growth of street and interurban railways in the States of Indiana, Illinois, Michigan and Kentucky, until today Indianapolis is recognized as the center of the great network of railways which reach out in all directions and comprise more than 5,000 miles of road. Boston may be the center of the universe, but we believe that Indianapolis is the center of the interurban electric railway systems.

"Much good has been accomplished in the states which I have named, by the Central Electric Railway Association, which has been the means of bringing the officers and managers of the different companies closer together, standardizing equipment, issuing joint passenger and freight tariffs and unifying the industry generally. But the greatest benefit to electric railways as a whole in the country has come through the American Association.

"We have so many legislative, executive and operating problems in common in the industry that a nation-wide organization is of incalculable advantage; so much so that companies who are not members of that association are apt to lose much in not being affiliated. The executive committee of the American Electric Railway Association holds monthly meetings at which are discussed the most vital problems affecting our interests. It is the desire of its officers that every live street and interurban railway company in all sections of the country become members.

"Let me here extend to you a most cordial invitation to attend the midwinter meeting of the American Electric Railway Association which is to be held in Indianapolis on Tuesday, Feb. 28.

"As president of the American Association I am afforded an opportunity of surveying the electric railway field throughout the country, and it is a pleasure to note the character and accomplishments of the New England Street Railway Club. You have contributed in no small measure to the growth and development of every city and town in New England and made this section of the country a veritable beehive of industry. While enjoying the benefits of street and interurban railway transportation we sometimes wonder if the public fully appreciates what an important factor your association has been.

PROBLEMS CONFRONTING INDUSTRY

"The problems which confront our industry are very much the same everywhere and may be principally summed up in the two titles—'Earnings' and 'Operating Expenses.'

"A proper rate of fare based upon a reasonable return on a fair valuation is the first requisite in the transportation business. Many of the failures of street and interurban railway companies in the past are due to the fact that this fundamental principle was not fully recognized by the public and the rate-making bodies, or if recognized, was ignored. Fortunately, a better understanding now prevails between the public and the electric railways and there is every reason to believe that with co-operation, justice and fair play will supersede antagonism and ruinous opposition.

"Those who have studied the electric railway situation are unanimous in their opinion that we have passed through the darkest days and that electric railways will in the not far distant future occupy a most important place in the business of the country. The exploitation of street and interurban railways is no longer popular. The public has learned wisdom and is now convinced that the growth and progress of cities and towns is so closely linked with electric railway transportation that the destruction of the one means the ruination of the other.

"With the various after-war problems of these days must come a readjustment of wages and a curtailment in operating expenses, without impairing service, if we are ever to reach a safe and normal basis. This brings up many perplexing questions but we must heroically face them. Commodities and supplies as well as the cost of living, although somewhat reduced, are still far too high. As the cost of labor enters largely into all our necessities we cannot have the anomaly of low prices and high wages. There must be a parity between the two. It would seem that both employer and employee recognizing the force of these conditions ought to be able to reach a mutually satisfactory understanding.

"Financiers who are now studying electric railway problems as never before are practically a unit in the belief that street and interurban railway securities have a bright future. While suffering much depression, they have nevertheless withstood the strain of war conditions and inadequate fares. With fair and equitable treatment on the part of the public and rate-making bodies we have every reason to believe that these securities, which are held by hundreds of thousands of investors throughout the United States, will increase in value and that the industry which we represent will once more flourish and prosper, not perhaps immediately as the scriptural 'Green Bay Tree,' but surely, steadily and substantially.

"Our great electric railway systems are bound to see a better day. In proof of this one has only to note the strength and character of the men who direct and manage them. Here, today, are assembled those through whose veins course the fighting and determined spirit of the men of Concord and Lexington. In the Middle West the undaunted spirit of Lincoln and the early pioneers still survives. While, in the Far West, the fearless, unflinching and progressive spirit of those who conquered the plains and streams, mountains and forests, still serve as a high and noble inspiration to their posterity.

"Let us then, Mr. President, turn our eyes to the rising sun of a better day which is already beginning to cast its bright rays upon the hitherto darkened spots of hampered opportunities and decreased revenues. Let us feel its warmth and inspiration, strong in the hope and belief that the full meridian of prosperity is not far distant."

DISCUSSION ON COMMITTEE'S REPORT

In presenting the report of the committee, Chairman L. D. Pellissier, Holyoke Street Railway, said that inasmuch as the report had been printed and distributed it would not be read. However, he pointed out that two-man cars occupied the largest field in New England and the data collected showed 1,368 such cars in operation during normal hours with 2,532 during the rush hours. Of the two classes of one-man cars operated 417 out of a total of 703 in normal hours and 517 out of 914 during the rush hours are former double-truck cars converted to one-man operation. The balance in each case are light-weight single-truck cars. Three companies operate from ten to twelve motor buses. The committee believes, as shown in its report, that the electric railways in order to function properly must use the most economical form of vehicle to handle the traffic offered.

H. B. Flowers, United Railways & Electric Company, Baltimore, said that the railways should no longer kid themselves about the failure of the jitneys in Bridgeport, Toledo and other cities mentioned in the report, for with a real organization and equipment the story might have been different. In Maryland the commission has fixed the trolley fare to meet the rising costs of operation and at the same time has forbidden direct motor bus competition with the railway.

COMPANY ASKED TO RUN BUSES

As the commission believes that transportation is a monopoly and as such should be protected it called in the Baltimore company and asked it to run buses to certain sections, which the company has agreed to do.

In speaking of the report of the committee he said it was a little negative where it referred to one-man cars. The little Birney cars he held were no good for handling heavy traffic and told how the Baltimore company had redesigned them, increased their weight, their width, made the aisle 4 in. wider and provided a wider service door, with the result that they now have a good car.

There was a possibility of using different vehicles in transportation, according to C. W. Kellogg of Stone & Webster. Intelligent operation calls for using the most economical type. He urged keeping the situation whole and not going crazy over the motor bus, for the one-man car represents a large investment in the railway business. The electric railway, according to the press, is going backward due to the gas-driven automobile. This, however, is not the case for an analysis of rail operations shows a steady increase in rides per capita. What the automobile has really done is to increase moving around. This has resulted in an increase in the rides per capita of 25 per cent notwithstanding the fact that there are nine or ten million automobiles in use.

The safety of one-man car operation has been more bitterly attacked in Boston and New England than in other parts of the country, and to show that these attacks were not justified he quoted the figures given on page 237 of this issue for operation in 1921 where both one and two-man cars were operated by Stone & Webster companies.

In speaking of what was the proper use of different type of vehicles Mr. Kellogg referred to the paper by Messrs. Pick and Shave before the 1920 A. E. R. A. convention. This paper pointed out that on the density of traffic depends the choice of unit. He believed that the figures given in this paper were worthy of consideration, and said it really was a case of what sort of traffic has to be handled.

He pointed out that the New York subway handled 70,000 passengers per hour in one direction on its ten-car trains. The real question in motor bus operation appeared to be "what to do with the existing investment." If an entirely new transportation system was to be laid out it might be a different story. The one-man car he claimed has been the salvation of the transportation industry from the public standpoint and also for many companies as it has given the cheapest service that can be furnished.

This is evident from the fact that there are to-day at least 5,500 one-man cars in the United States that run 200,000,000 car-miles and carry nearly one billion passengers annually. Their operation has saved the companies operating them $12,000,000 in operating expenses notwithstanding they have added a million dollars to operators' wages.

The next speaker was Col. G. A. Green, general manager Fifth Avenue Coach Company, New York. He characterized the report a fine piece of work but said he was an unashamed exponent of the motor bus as he had spent twenty years in its operation. The one-man car was a logical development but he held that it should be built as light as possible, and urged that light-weight alloys and modern methods of body construction be employed. A more extended abstract of his remarks appears in the February issue of BUS TRANSPORTATION.

J. A. Queenay of the General Electric Company, the next speaker, commented on the report. He said that the possibilities of the light-weight double-truck car were great, but that as yet it had only been used to a limited extent. One instance was mentioned where it was being used on a 27-mile interurban line having twenty-two fare zones and that a 20 m.p.h. schedule was being maintained satisfactorily. One of the first electric railways in New England to use the light-weight single-truck safety cars was the company in Bangor. This company is now about ready to make use of the double-truck light-weight safety car on one of its interurban lines.

The motor bus, he said, had come to stay but he did not agree that the trolley bus did not also have a place. He compared their advantages and disadvantages and outlined the trackless trolley developments since the tests made at Schenectady last June.

K. A. Simmon, Westinghouse Electric & Manufacturing Company, was still enthusiastic over the railway track and all, and could see a lot of good yet in rail transportation. His remarks followed closely the sense of the article appearing in this issue on page 233.

Carl H. Beck, Westinghouse Electric & Manufacturing Company, said that the single-truck type of safety-car was but a forerunner of the double-truck, one-man car that is now being developed. The idea of the single-truck one-man car is only five or six years old, but nevertheless it is now a certainty and as such is being used by all of the railways that are trying to deliver street car service at the lowest cost.

Two years ago he said he stated that within five years there would be no such thing as a two-man car in operation. He still is of the opinion that there will be very few and urges that more attention be paid to changing over existing two-man cars for one-man operation.

H. E. Howell, National Railway Appliance Company, New York, in comparing the cost of street-car operation with that of the motor bus declared that the street railways should purchase their power from large power companies, as under their present conditions of operation they had to maintain a large power reserve. One kilowatt consumption at the car requires practically 3 kw. capacity in the power plant. Reference was also made to the practice in Chicago of purchasing power which was instigated as far back as 1907, when the new ordinances became effective.

More constructive thought should be given, he believed, to the design of the underframe of not only the one-man car but to the motor bus. One-man cars he said were soon to be operated in London.

G. E. Pellissier, Holyoke Street Railway, was in hearty accord with the idea propounded by the committee that it was the duty of street railways to use what ever was the most economical vehicle for the form of transportation service rendered. He held that all things considered the railways should not be prejudiced for or against any particular type or design of vehicle or motive power. Continuing he said:

THREE THINGS TO KEEP IN MIND

"In considering the requirements of public transportation, at least three things should be kept in mind—necessity, desirability and cost, proper weight being given to each of these elements. The conclusion as to the service to be rendered in any particular case, should be based on a careful analysis of these elements. It might well be that these factors would not be given the same weight in different localities and under different conditions. In some places people might desire, above all things, low cost; in others, frequent headway; in others, high speed; while in others a compromise of all of these three might prove more satisfactory.

"In the matter of cost of transportation, it is necessary to be extremely careful as so many elements affect the cost that a comparison of costs for furnishing transportation is difficult, and further, that some kinds of service would not be tolerated at any cost.

"While a good deal has been said about merchandising transportation, in the business of transportation of the public, to a greater extent than perhaps in any other business, is it true that the best advertisement is a satisfied customer. In some businesses it may be possible to succeed, temporarily at least, by fooling all of the people part of the time or a part of the people all the time, but in our business, we have to deal with all the traveling public all the time and we cannot hope to succeed that way even if we desired to do it.

"If, through lack of analysis or faulty analysis, we make wrong decisions, sooner or later we—and I mean by that the whole industry—shall have to suffer for them.

"In analyzing various methods of transportation, I would like to emphasize the importance of speed on account of its influence, not only on the cost of operation but also on account of its relation to desirability of the service.

"The average American wants to get there and is usually willing to pay the freight when the goods are delivered. While the slogan 'A car always in sight' may be a good one, we want to be sure that the reason for this isn't that it takes so long for the car to get out of sight.

"I believe the possibilities of speeding up schedules would surprise a good many street railway men, and if they figured carefully what could be done in this direction, they might find in many instances that they could go to considerable additional expense to obtain higher speed and still be able to furnish transportation at a lower unit cost.

"Nobody advocates or wants to advocate using two men to do the work which can be done just as well by one, but this does not warrant the conclusion, off-hand, that the employment of less men necessarily reduces the unit cost.

"In spite of the fact, however, that elevator manufacturers have been successful in developing a type of elevator which can be satisfactorily and economically operated by push-button control, I do not find them making the statement that this particular type of elevator should be used in all places and at all times, and should be immediately adopted by everybody as is the case with some of our street railway enthusiasts who have used some particular type of vehicle or system of transportation successfully.

"Among the elevator men undoubtedly will be found some conservative enough to advocate 'hooking her to the biler.' But even they do not go so far as to urge the use of the same type of elevator in the Equitable Building in New York as in an apartment building or a two-story loft building.

"In analyzing the problem of furnishing transportation to the public, it would seem also that it might be well to take into our confidence the fellow who is going to use the service and pay for it. It might be possible to obtain from him his view before jumping to the conclusion that because we want to adopt a certain method of fare collecting, that he will like the pay-as-you-enter feature or because we want to eliminate one man from the car, that he is going to like a type of car with the entrance and exit equipped with various obstacles such as barriers, rails, turnstiles, etc.

"It may be that he will, but if the situation is explained to him, and he is fully aware that the reason for doing this is to reduce the cost of his ride a fraction of a cent or a few cents, he may prefer to pay a trifle more and get something that he likes.

"This applies particularly to speed and I believe many times the public would choose speed rather than frequent headway, if they were sure to obtain reliable and speedy operation at less frequent intervals.

"This I think is sufficient to illustrate the idea in mind and I only want to reiterate the necessity of careful analysis of the needs and desires of the public in the way of transportation and a careful study of the cost, not only with various types of vehicles, but with the various methods possible with each type.

"I wish further to emphasize the importance of cost accounting in transportation. Having made this analysis, my recommendation would be to select the tool for the job and use the one which gives the best results, all things considered."

Ralph D. Hood, Massachusetts Northeastern Street Railway, said that four Birney cars had been operated in Rochester, N. H., since June 1, at a considerable saving over the cost of the standard two-man type of car. He gave the costs of operation per car-mile for the safety cars as follows:

	Cents
Way and structures—(prorated on a flat basis)	6.18
Equipment	2.82
Power	4.77
Conducting transportation:	
Labor	5.26
Miscellaneous	4.22
Traffic	.64
General and miscellaneous	2.64
	26.53

Less mileage was operated by 4 per cent with a 27 per cent saving in kilowatt-hour usage. Of the total service run 56 per cent was Birney car operation. The total saving of one-man operation over the two-man operation was 10.07 cents per car-mile, since the cost of two-man operation was 36.58 cents per car-mile.

Mr. Hood is optimistic as to the future and says that "street railways having lived since 1917 are due to live on for a great and glorious life."

New England Club Committee Analyzes One-Man and Bus Situation*

In Thirty-seven Page Pamphlet Committee of New England Street Railway Club Presents Results of Several Months of Study of Available Data on this Subject—The Inter-Relation of These Vehicles Is Outlined

THE New England Street Railway Club has had a committee at work for some time making an analysis of the development of the one-man car, the motor bus and the trackless trolley and this committee rendered its report to the club at its dinner at the Copley-Plaza Hotel, Boston, on Thursday evening, Feb. 2. The report has been issued in printed pamphlet form, some thirty-seven pages long, and is quite full in presenting not only the history of the development of these three transportation units but also the viewpoint of the committee with respect to them.

In starting the report, the committee makes the following statement:

"The committee has approached the subject assigned to it with the one though foremost in the minds of its members that the industry owes it to itself and to the riding public to adopt any development in the art of transportation which will give the public good transportation at the lowest possible cost. Of the three vehicles assigned to the committee for its consideration the one-man car has been the most used by street railways. The experience of the companies which have used this method of operation to a considerable extent for the past three years should be of great assistance, not only to themselves when considering its extension, but also to other companies when considering its adoption. In reference, however, to the motor bus and the trackless trolley, the experience of street railways is as yet very limited, and your committee hesitates to prophesy what the future developments will be because of the lack of sufficient information on which to base a judgment.

"It is to the mutual advantage of the street railways and the public that a proper standard of transportation should be maintained. We are all interested in performing to the best of our ability the public service delegated to us. At the same time we are interested and the public is interested in having that service rendered at a low cost. We feel that the street railway transportation as now constituted, that is, with electric cars running on steel wheels on steel rails, has passed through the experimental period as well as through its period of greatest trials in the past few years and has entered upon a new era which will increasingly demonstrate its necessity. At the same time there is taking place the development of rail-less transportation which may be demonstrated, as time goes on, to be more economical for some kinds of service.

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*Digest of report of the committee on development of one-man car, motor bus and trackless trolley presented to the New England Street Railway Club at its dinner meeting on Feb. 2, 1922, Copley-Plaza Hotel, Boston.

"If there is anything in this report which will help to show the street railway operator in what manner he can adapt the rail-less transportation to his needs as well as the one-man operation of street cars, your committee feels that it will have well served the purpose for which it was appointed."

The report then reviews the history of development of one-man operation on cars, showing that at present there are at least 914 one-man cars in operation in New England in the rush hours. These may roughly be divided into two types, the light-weight single truck and the heavier double truck. Of the 914 one-man cars in such service 455 or 50 per cent are of the light-weight type and 417 or 46 per cent are of the heavier double-truck type. Most of the single-truck cars are new equipment, especially built for one-man operation; they are generally equipped with the latest devices for control of the car. The double-truck cars, on the other hand, are principally former two-man equipment changed over. The extent of the changes varies all the way from a complete installation of the latest devices to no changes whatever. In this changeover, also, the committee points out that there has been little uniformity among the various companies. Generally speaking, such changes have been made when each company believed it necessary in order to facilitate the handling of passengers in and out of one end of the car, properly collect the fares, and give the public proper protection.

As to weight of equipment, the first single-truck cars weighed about 10,000 lb., but at this time the weight has been gradually increased to about 16,000 lb. The committee states that actual operation shows these heavier cars to be more serviceable than the extremely light ones. The committee commends the development of the light-weight — 27,000 lb. — one-man double-truck car. This is the latest development and these cars are just being put in service in New England.

"One-man car operation" the committee says, "is an established electric railway practice. There can no longer be any doubt as to the desirability of its use under a great many different operating conditions. At the present time in New England one-man cars are used in practically every kind of service with the exception of heavy city traffic where train operation is advisable. They are operated on interurban lines with schedule speeds as high as 15 m.p.h., and in city service with a frequency as often as a car every two minutes. They are operated in the subways of Boston. They are in service on lines of one fare zone and on lines with seven or more zones. There are cities of medium size where the service is almost entirely one-man operated."

The committee also points out that coincident with the development of the one-man car came the light-weight car. This has made possible many economies in addition to saving in labor, such as power and lower maintenance of equipment and maintenance of way. Of these savings, that of power is very tangible and of a considerable amount; the maintenance of equipment is hard to determine, but experience shows it to be material, whereas the saving in maintenance of way is at least tangible but can only be definitely established over a long period. The committee points out that if track is once put in good condition, it can be maintained in such condition if used only by light-weight cars, with a surprisingly small expenditure.

The committee discusses the complications of fare collection on one-man cars except where the prepayment plan is used with one fare collection. The committee makes no recommendation or draws no particular conclusion with reference to difficulties of fare collection.

The committee does say that experience with one-man cars shows that it is desirable to provide all reasonable facilities for expediting the movement of cars and that usually the savings from the operation of such cars warrants the providing of such facilities. Those facilities mentioned are electrically operated track switches and automatic signals. On account of the combination of duties of motorman and conductor, the committee points to the particular importance of arrangement of light and the proper protection from glare on the front window.

With reference to the serious operating problem in connection with the loading and unloading of passengers, the committee discusses the delay of the single entrance and states its belief that much may still be accomplished along the line of securing a double flow of passengers. Admitting that the problem is somewhat complicated with various fare and traffic conditions, the committee ends its discussion on this subject by saying: "We believe, however, that there is sufficient ingenuity in the industry to work out a solution of this problem which as yet has not been entirely solved."

THE MOTOR BUS

In its study of the motor bus, the committee gives a brief history from July 1, 1914, when as it says, "The first jitney charging a 5-cent fare appeared in Los Angeles, Cal." The story follows briefly through the stage of wild-cat operations to the present time. The committee points out its opinion that a large part of the growth from 1914 to 1920 was the result of the attitude which the automotive industry had in marketing its products, wherein it confined itself almost exclusively to selling the pleasure car or a motor truck chassis with engine installed to independent motor bus drivers, who in most instances competed directly with the street railways throughout the country. The report goes on to discuss types of vehicles, and their cost of operation.

THE TRACKLESS TROLLEY

In discussing the trolley bus the committee gives first a historical sketch of its development both abroad and in this country. In the entire development so far of trolley buses operation has not extended to more than 200 miles of route, and then in widely different parts of the world and which naturally have a great variety of operating conditions. Operating costs are estimated to be 25.51 cents per bus-mile. Some of the advantages and disadvantages of the trolley bus are listed. A more extended abstract of that part of the committee's report on the use of motor buses and trackless trolleys is given in the February issue of BUS TRANSPORTATION.

In conclusion the committee recommends that New England Street Railway men keep constantly in mind the possibility of adopting any one of these three methods of transportation in the development of their services.

SUMMARY AND CONCLUSIONS

In conclusion the committee recommends that New England street railway men keep constantly in mind the possibility of adopting any one of these methods of operation in the development of their service. It then says:

"The committee hesitates to recommend in a report of this sort just where any individual street railway operator should adopt these different methods of transportation, but feels that street railway men as a whole ought to be quick to recognize the possibilities of these new methods and are in duty bound to adopt them in carrying on the natural monopoly which they have for street transportation of passengers in the various districts they serve, wherever careful analysis of the situation shows that as good or better transportation could thus be provided at less cost than by the present methods.

"In the matter of one-man operation, the committee is of the opinion that it has been demonstrated that a properly equipped electric car can be operated by one man under many different operating conditions with advantage to the public and the street railway. Further, this method of operation has the indorsement of our public authorities and should direct our attention to operation of cars with one man whereever careful analysis shows that this can be done to the benefit of the service, all things considered. In addition, the recent development on certain properties of the so-called light-weight double-truck car, whether operated by one man or two, should be studied closely, as the committee believes that there is a considerable field for this type of car, particularly for one-man operation.

"Relative to the motor bus and trackless trolley considerable advancement has been made during the past year and the manufacturers of each now have in mind to a large extent the needs of street railways. There are certain portions of street railway lines now existing where on account of the expense involved it is undoubtedly impracticable to rebuild the tracks and where it might be preferable either to abandon or tear up the tracks and by the addition of another overhead wire install the trackless trolley. The committee believes that in many instances it would be preferable before even going to the expense of installing trackless trolley to install a motor bus service over the line on which the tracks have been selected for abandonment and to try out the motor bus for a period before undertaking the expense of equipment for the trackless trolley.

"The committee feels that the street railway operators should keep these two vehicles constantly in mind when contemplating extensions of lines either within or without the territory now served by them. In the early days of operation on these extensions we suggest to the operating officials the advisability of using the motor bus until the final route has been established and a sufficient amount of traffic has been created to warrant expenditure for equipment of the trackless trolley line. In the establishment of extensions to the street railway lines, during the development period there seem to be three different stages that the street railway operator should contemplate with the three vehicles that have been studied by this committee:

"1. A motor bus service tried out over various routes in order definitely to establish the route by which it will best serve the public at the least expense.

"2. The trackless trolley service placed in effect after the route has been established and a sufficient number of riders obtained.

"3. The laying of tracks and car operation as the community becomes built up and the receipts warrant the capital expenditure.

"Once the tracks are laid the question of one or two-man operation should be carefully figured to determine which will be the more economical and satisfactory, all things considered.

The committee gives credit to the following organizations and publications for information used in compiling its report: ELECTRIC RAILWAY JOURNAL; American Electric Railway Association; Public Service; *Aera;* Public Service Commission of Massachusetts, annual reports.

Courts vs. Commissions

New York Judiciary Committee Condemns Unjudicial Acts of State Commission in Report to Legislature

A SCATHING criticism of the unjudiciary nature of the decisions of some state commissions is contained in a report of the judiciary constitutional convention to the Legislature of the State of New York, dated Jan. 4, 1922. This report is the result of a study made by the direction of the Legislature last year by the judiciary of the state to report to the Legislature proper amendments to the judiciary article of the constitution. The chairman was William D. Guthrie, and the executive committee was made up of prominent members of the bench and bar. A portion of the comments on commissions follows:

"For centuries before our Revolution, it had been regarded in England to be a sound constitutional principle, as phrased in Magna Charta itself, that all should be entitled to trial in courts of justice held or presided over by judges who know 'the law of the realm and mean to observe it well.' The reasons which have led the convention to the conclusion that an express provision is now needed are substantially as follows:

"Of the political phenomena of our times, perhaps none is more striking than the constant extension of the functions of government, with the consequent multiplication of public officials and of interference with the conduct of private individuals. The tendency to extend the activities of the state has been world-wide, for manifestations of it are observable in every country, whatever the form of government may be. The Great War has markedly, if not portentously, accelerated this tendency. In the United States, there are everywhere being developed at enormous cost in the most intensive fashion a multitudinous bureaucracy with autocratic powers and arbitrary discretion, and a vast system of complicated and often conflicting administrative jurisdictions in relation to property and businesses and personal conduct, which reach and affect almost every individual, and most of which, only a few years ago, would have been regarded as of strictly private concern and not to be tolerated by a free people. Extensive legislative, executive and judicial powers are being vested and combined in administrative bodies in distinct and reckless disregard of the sound principle of the separation of governmental powers, which was deemed so essential to the due protection of individual rights by the wise founders of our republican form of state governments. Even controverted questions of law and fact, hertofore regarded as fundamentally and exclusively for judicial determination, are being entrusted to bureaucratic discretion, and for orderly judicial procedure as known to our fathers and the competent and impartial interpretation and enforcement of the laws by learned judges and impartial juries, arbitrary methods and untrained judgment are being constantly substituted. The increase in public functionaries and public expenditures within the past twenty years in our own State and municipalities has been at a rate which is regarded by many thoughtful and competent observers with alarm as imperiling not only our liberties but the very solvency of the State and its cities. Chief Judge Cullen warningly said in one of his instructive opinions: 'The great misfortune of the day is the mania for regulating all human conduct by statute, from responsibility for which few are exempt, since many of our most intelligent and highly educated citizens, who resent as paternalism and socialism legislative interference with affairs in which they are interested, are most persistent in the attempt to regulate by law the conduct of others' (*Matter of Hopper v. Britt*, 204 N. Y. 524, 534).

"There can, indeed, be no doubt that there is an impulse and tendency in this State, as elsewhere, to vest judicial powers in administrative bureaus composed of officials untrained in the law and to make their findings more or less conclusive. This policy involves a menace to the inalienable personal and property rights of all our citizens and to all our ideas of the due and fair administration of justice according to law. The people of the State of New York, if acting advisedly, are, it is profoundly believed, not likely to be willing to vest or leave any such absolute and unreviewable judicial power over their most sacred personal and property rights in untrained officials frequently utterly ignorant of the most elementary principles of justice as developed in jurisprudence from the experience of ages.

"Moreover, hearings before administrative boards or commissions are frequently very unfair and often place any person or corporation affected or aggrieved at a great disadvantage. Proceedings are being constantly instituted by such boards or commissions of their own motion; they allow themselves to become committed to certain views which they do not hesitate to publish; they declare in the public press, before hearing any affected or aggrieved party, or hearing both sides, that they will or intend to do such and such things (*e. g.*, reduce rates of carriage or telephone or light or other public service) in complete disregard of the most elementary principle of fair play embodied in the maxim that no man should be condemned unheard—*audi alteram partem*. When the hearings do begin, the board or commission is often already committed, not to say prejudiced, if only unconsciously, in favor of preconceived and adversary views. The counsel of the board or commission, in daily conference with its members, has an immense and unfair advantage over his adversary representing the individual or corporation whose property or personal rights are involved or menaced.

The board or commission, in a word, in many cases acts as judge in its own case, instituted by it, pressed before it by its own counsel, and as to which it has, sometimes with much clamor and boasting, published its preconceived views. Such a board or commission becomes what a distinguished English law writer has called 'that judicial monster, a judge in his own cause.' These boards or commissions necessarily become partisans, and the whole atmosphere is the very negative of what a court of justice ought to be or what American fair play should guarantee. It is in essence the determination of rights by bureaucratic fiat. And it ought to be pondered long and carefully that the risk of the ultimate development of arbitrary and irresponsible power and bureaucratic tyranny is altogether too great to be suffered to exist or permitted to be extended in this State.

"To hold up such performances as fair hearings or quasi-judicial proceedings before an unprejudiced and impartial tribunal is verily to travesty all that honest and fair-minded men conceive to be embodied in and guaranteed by the term justice. Yet, there is a strong movement in this State and elsewhere to make the findings of such boards or commissions conclusive and final, generated by impatient reformers or propagandists who would avoid the delay necessarily involved in being just! The proposed amendment will guarantee to all affected or aggrieved an ultimate hearing by a real court of justice whenever interference with or violation of private rights is threatened.

"The Supreme Court of the United States has, for example, recently held in a rate-fixing case that a fair opportunity must be provided by the state for submitting the question whether rates are or are not confiscatory to the determination or some judicial tribunal acting upon its own independent judgment as to both law and fact and that 'otherwise the order is void because in conflict with the due process of law clause, Fourteenth Amendment' (*Ohio Valley Co.* vs. *Ben Avon Borough*, 253 U. S. 287, 289). But this salutary ruling still leaves it within the power of a state, unless restrained by its own constitution, to unite administrative and judicial powers in the same body, and thereupon to deny any appeal to real and competent courts of justice. *Prentis* vs. *Atlantic Coast Line*, 211 U. S. 210, 225; *Reetz* vs. *Michigan*, 188 U. S. 505, 507; *Hibben* vs. *Smith*, 191 U. S. 310, 321.

"It is submitted that it should be of paramount concern to all classes of citizens that their personal and property rights should not be placed or left within the power of any administrative board or commission or bureau to determine conclusively without right of appeal to the courts of justice of the state, and that the authority to delegate any such arbitrary power to administrative bodies by constituting them courts should not be left any longer in the hands of the legislature unrestrained by constitutional limitation."

The Tax Exempt Security Attacked Again

THE following resolution was adopted by the Oregon State Chamber of Commerce at its third annual convention, which convened in Portland, Ore., Jan. 3, 1922:

Whereas our present policy of Federal taxation has undergone a most radical change from that of indirect to direct taxation and

Whereas such change has resulted in chief reliance being had upon a graduated scale of taxation upon income that levies high rates upon those of large income, and

Whereas by reason of such rates there is a constantly increasing volume of capital being invested in and diverted into non-taxable securities of the Federal, state and minor subdivisions of government and instrumentalities of government, and

Whereas the investment and diversion of such capital has proved a serious handicap to productive enterprise and has given to such exempted securities an unfair competitive advantage in the markets for capital, and

Whereas such investment on the part of those of large income serves to exempt them from the payment of taxes they otherwise would be obliged to pay, and

Whereas there is thereby necessarily imposed upon those who cannot benefit by such exemption an unfair burden of taxation; now, therefore be it

Resolved, by the Oregon State Chamber of Commerce in third annual convention assembled, that it recommends that necessary corrective legislation be provided to remove the present inequitable burden of taxation and to make all income from whatever source and in whatever form bear its just proportion of the cost of government and remove the discrimination now prevailing between securities of government and those of private enterprise, and, be it further

Resolved, That a copy of this resolution be transmitted by the secretary to each member of Congress from Oregon.

It will be the cumulative effect of such action as this which will be necessary ultimately to secure elimination of the tax exempt security.

A. S. T. M. to Meet at Atlantic City

THE annual meeting of the American Society for Testing Materials will be held during the week of June 25, at Atlantic City, N. J., with headquarters at Hotels Chalfonte-Haddon Hall. Monday, June 26, will be given over to committee meetings, and the convention will open Tuesday morning, June 27, and close Friday evening or Saturday morning, July 1.

Union Internationale de Tramways

THE Union Internationale de Tramways et de Chemins de Fer d'Intérêt Local, whose headquarters are in Brussels, will shortly be reorganized. This step has been decided upon by the executive committee because before the war the membership was made up of companies from all parts of Europe, and the purpose now is to confine the membership to the railway companies in the allied countries and those neutral during the war. To do this, disbandment of the old association and reorganization seem to be the simplest way from a legal standpoint. It is hoped that a convention under the new auspices will be held during the current year.

American Association News

Publicity for the Midyear Meeting

J. W. WELSH, executive secretary, has sent to member companies a suggested newspaper notice for local publicity on the Midyear Meeting to be held at Indianapolis on Feb. 28. This is intended, apparently, as a suggestion to individual railways to use the Midyear Meeting as a further legitimate means of keeping the electric railway industry prominent in the eyes of the general public.

The notice mentions the place and date of the meeting, suggesting that railway men from all over the country will be present, and then indicates a mention of local men who will attend. A general outline of the principal subjects is given, stress being placed upon the discussion of trackless transportation, and President Todd is quoted as to why the association should study this question and as to where the bus may fit in.

Convention Train de luxe Danville to Indianapolis

THE Illinois Traction System will operate a 4-car train from Danville, Ill., to the Feb. 28 convention, according to plans of H. E. Chubbuck, vice-president executive of the company. The train will comprise a 60-ton locomotive, a passenger coach, a sleeper and a parlor car. The train will be hauled over the "Big Four" from Danville to Crawfordsville, Ind., and will proceed thence under its own power over the lines of the Terre Haute, Indianapolis & Eastern. Part of the equipment was built by the I. T. S. and the train will constitute an exhibit at the meeting.

Live Topics on Way Matters Discussed at Two-Day Session of Way Committee

THE first meeting of the committee on way matters of the Engineering Association was held at association headquarters in New York City on Feb. 2 and 3. Members present included W. F. Graves, chairman, H. H. George, vice-chairman, R. C. Cram, sponsor, V. Angerer, C. A. Alden, E. B. Entwisle, E. P. Roundey, C. F. Gailor, E. M. T. Ryder, W. R. Dunham, Jr., W. W. Wysor and H. Fort Flowers. Also present by invitation were James Budd and F. A. Weymouth, Bethlehem Steel Company, and E. F. Kenney, Cambria Steel Company and chairman Committee A-1, American Society for Testing Materials.

As to car clearance easements it was decided that 6 in. may be considered a safe working clearance for all parts of the track layout. The desirability of recommending slight changes in cars to lessen end overhang and side overhang at curb corners is to be taken up with the committee on unification of car design.

The committee now proposes to offer as a "recommended design," the clearance easements presented to the convention for information last year. Members of the association are requested to submit comparisons between their present company designs and association designs applied to the same layout.

The committee adopted for submission as "recommended design" the following on location of tongue switches: "Switches should be located on the inside of the curve for lateral switches and on the righthand side, facing the switch for wye switches. Wye switches should have a straight guard at the toe of both switch and mate."

Some progress was made in the study of curved contours for new wheels. This subject was combined with the design of wheel treads and flange contours in co-operation with the committee on equipment. Mr. Flowers will act as chairman on both subjects. The committee voted to express the view: "that the contour of wheel treads should be revised by compounding the curve connecting the wheel tread and flange, better to conform to the contour of the treads of association standard girder grooved rails and flange-worn rails so that there can be only one point (or area) of contact between wheel and rail at the same time." An attempt will be made to get this subject actively before the equipment committee.

The view was expressed that one thickness of flange for wheels for all types of urban service is desirable.

The subject of impression tests for girder rails was considered at length in conference with Mr. Kenney of the A. S. T. M. The committee is inclined to favor this test as a substitute for the drop test but wishes more information regarding it.

It is proposed to modify the specification for girder rail manufacture (Wr. 2c) in respect to milling and rail ends, to read: "The ends shall be milled square laterally. They shall be undercut not less than $\frac{1}{32}$ in. and not more than $\frac{3}{32}$ in." The present specification does not provide permissible variations in undercutting but actual practice requires this.

The committee decided to recommend the adoption of the current A.S.T.M. specification serial designation "A-1-14" covering the manufacture of standard section (low-T) rails. The association has no specification for these now and the industry purchases mostly under A.S.T.M. specifications. A new clause permitting milling of rail ends, where rails are for use with welded joints in streets, is to be added as follows: "25 (d) When required by the purchaser and so specified, the ends of the rails shall be milled. When so milled, the following permissible variations shall govern: They shall be undercut vertically not less than $\frac{1}{32}$ in. and not more than $\frac{3}{32}$ in. The head of the rail shall not be more than $\frac{1}{64}$ in. out of square horizontally."

As to design of substitute ties the committee decided to outline the functions of design which govern, and to analyze present designs, to determine how nearly they approach the desired features.

There was an extended discussion of the subject of arc-welded rail joints and the view was expressed that the wide interest in them demands prompt consideration of the matter of furthering research work. The work of the committee on welded rail joints was considered in this connection.

The committee decided that there is a need for standard specifications for sundry track materials such as bolts, tie plates, tie rods, spikes, etc., and members are asked to submit specifications of the items to the committee. It is hoped to have tentative specifications ready for the committee meeting tentatively scheduled for early in March.

Tables of dimensions for frogs used in tongue switch and split switch constructions were submitted by the subcommittee and it was decided to add the No. 4 and No. 10 frogs to the list. These tables will probably be available for the next meeting, when the whole list will doubtless be adopted for submission as a recommended association design.

On the subject of design of track construction for paved streets, the committee planned to co-operate with the American Society for Municipal Improvements in this matter and a questionnaire has been issued requesting data upon which to base a study of designs which may be discussed with this association.

Finally after discussion the committee decided to recommend no change in the existing specification of the association covering splice bars for girder rails, although some question had been raised regarding the chemical content. When the requirements of bars for seam-welded joints are better known it will be desirable to provide a specification to cover them.

January Bulletins Available

THE association's Bureau of Information and Service prepared the following six compilations during January, which are available to member companies upon request:

Working Conditions of Trainmen, including length and kind of runs, overtime rates and other allowances.

Wage Reduction in Other Industries—Based on a report prepared by the National Industrial Conference Board, Jan. 17, 1922.

Securities Issued by Electric Railways during 1921, showing face amount, offering price and rate of interest.

Electric Railways in the Hands of Receivers as of Jan. 1, 1922.

Electric Railways Abandoning Service and mileage of track dismantled and sold as junk as of Jan. 1, 1922.

Wages of Employees Other than Trainmen—Supplement to compilation of Dec. 1, showing wages paid employees in general maintenance and operating departments.

In addition to the above supplements to the wage bulletin, the fare bulletin and the cost of living studies have been prepared, bringing them up to date.

Research Report No. 45, "Wages and Hours in American Industry, July, 1914, to July, 1921," is now available for distribution at $2 per copy. This is the most comprehensive wage investigation undertaken in this country.

Lecture on Lumber Before Chicago Section

AT THE regular meeting of the Chicago Elevated Railroads company section, held on Jan. 24, the speaker was Russell Green of the McLeod Lumber Company, who gave an interesting and instructive talk on the lumber industry. Through the courtesy of the Southern Pine Dealers' Association he was able to illustrate his talk with a four-reel motion picture which showed the process of lumber manufacture from the cutting of the trees in the forests to the finished products, such as ties, cross-arms, poles and structural lumber.

The meeting was attended by 100 persons and was opened with the singing of "America."

Camden Section to Continue Monthly Meetings

AT A MEETING of the Camden company section No. 13, American Electric Railway Association, on Thursday, Jan. 19, the following officers were elected: President, C. V. Wallace; vice-president, W. H. Wright; secretary, George B. Stoll; treasurer, Patrick O'Connor; director for a period of three years, Edward Lowden.

There was no regular program, and the evening was spent in a social session. The executive council announced that it has been decided to continue to hold company section meetings each month on the third Thursday.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Detroit Meeting Eventful

Directorate Shaken Up — Company Given More Time to Sell Out or Get Out

At the meeting of the stockholders of the Detroit (Mich.) United Railway on Feb. 7 the Canadian stockholders headed by A. Avila Gingras voted proxies for more than 92,000 shares. Alex Dow, Detroit, and Harrison Williams, New York, were retired from the board of directors. Neither was present at the meeting. Mr. Dow's connection with the company began about a year ago when he consented to serve on the board in an endeavor to smooth out the difficulties between the company and the city.

Four other directors of the company were retired and the following board was named: Charles Laurendeau, Louis A. Gosselin, J. Ovide Desmarais, Honore Blouin, J. E. Gill, P. A. Bovin and A. Avila Gingras, all placed in nomination by Mr. Gingras, and J. C. Hutchins, Allan F. Edwards, A. J. Ferguson and E. W. Moore, nominated by Mr. Moore. The four last named were re-elected. Mr. Laurendeau also was a member of the 1921 board.

Not all the new directors will sit on the board permanently it was announced. The stockholders intend to replace three of the members with Detroiters, making the board consist of five Canadians and six Americans.

No one was named to fill the offices of president, vice-president and treasurer and it was announced that the three vacant offices would not be filled for the present. The officers named are: Chairman of the Board of Directors, J. C. Hutchins; Secretary, A. E. Peters; Assistant Secretary, Emma Heise; General Manager, E. J. Burdick; Acting Treasurer, Joseph Bompton. Mr. Burdick was formerly assistant general manager. Mr. Bompton was formerly assistant auditor.

At the adjourned meeting of the new board of directors a committee consisting of Elliott G. Stevenson, J. C. Hutchins, E. J. Burdick, A. Avila Gingras and J. C. Butterworth was named to confer with the city of Detroit relative to the proposition of the city to purchase the company's city lines. This offer was submitted by the Street Railway Commissioner through Mayor Couzens on Tuesday.

At the meeting the old administration was charged with having voted its members excessive salaries and with poor management and poor financing. The report for the year, read by former Vice-President Edwards, was discussed and at several points attacks were made by the spokesman of the Canadian stockholders. In response to the charge of poor financing it was brought out that the company has no outstanding notes, everything having been liquidated. Mr. Hutchins told stockholders that the company is in good financial condition.

At the meeting on Tuesday the mayor proposed paying the company $16,500,000 for its lines within the city, exclusive of real estate. A motion to place the commission's letter on file was voted down. A letter to the company was presented from Ross Schram, assistant general manager of the Municipal Railway. It stated that while the communication was not an ultimatum to the company, it was a notice that the stockholders must appoint a committee to consider immediately the sale of the property or instruct the directors to do so and that failure to act would leave to the city only the alternative of resorting to its legal rights. The commission feels that any further negotiations would be of no avail. The letter was read to the mayor.

The mayor was present at the adjourned meeting and warned the company that it should consider the sum he offered by March 1. He stated that it is an opportunity for the stockholders to get the most they will ever get out of the property. Feb. 21 was suggested by the mayor as the date for further parleys and the stockholders voted to empower the board to negotiate with the city officials on a purchase price for the entire city system to be submitted to the voters for approval. The directors will confer with the city in the meantime and report at the adjourned meeting on Feb. 21.

Bill Introduced in New York to Avert Strikes

Designed to prevent strikes and lockouts harmful to the public interest, the Industrial Relations bill was introduced in the Senate on Feb. 8 by Senator Duell, chairman of the Senate committee on labor, and in the Assembly by Assemblyman Miller of Genesee. It was referred to the committees on labor and industries in both houses and there will be a joint hearing before these committees in March.

The measure as drafted by the New York Board of Trade and Transportation provides for an industrial relations term of the Supreme Court as final arbiter of labor disputes. The Court is empowered under the bill to take over and operate essential industries during emergencies affecting the public welfare arising from violations of the proposed law when such emergencies can not be averted through operation of prohibitory clauses.

United Railways Under Fire

Politicians Become Restive, Attack Receiver and Complain About Fares and Service

After nearly three years of comparative freedom from political attack under the receivership, the United Railways, St. Louis, Mo., came under fire of the Board of Aldermen a few days ago when that body authorized its public utility committee to make a thorough investigation of the railway service. The Council had previously denounced the service by resolution and had held that the 7-cent fare was too high.

MUNICIPAL OWNERSHIP ADVOCATED

Simultaneously with the attack by the Aldermen, the City Counselor, Henry S. Caulfield, in a speech before a public improvement body, advocated municipal ownership. Incidentally he criticised Rolla Wells, receiver; Col. A. T. Perkins, manager, and Charles W. Bates, general counsel, saying the combined salaries of these three officials, amounting to nearly $100,000 a year, were excessive, and intimating that they were not competent railway men. He said:

> How would you like three politicians, or men not familiar with the subject, to be placed in charge of the Water Works. It is time we quit farming out our utilities.

Although the Aldermen admit they have no control over the affairs of the United Railways except in matters of sanitation, their investigating committee declares it will examine witnesses and submit findings to the Missouri Public Service Commission, hoping to bring out evidence that has not been discovered by the State body in its exhaustive valuation hearing which will be resumed on Feb. 20.

MANAGEMENT WELL FORTIFIED

In his reply to the Aldermanic attack, Col. A. T. Perkins, in the absence of the receiver, said the management would be glad to furnish the committee with full data as to matters brought up in the resolutions. The complaints of poor service, he said, were based largely on isolated or infrequent cases. Mr. Perkins said:

> It must be remembered that the rate of fare was reduced (from 8 to 7 cents) in April, 1920, and that it is now below that in most other comparable cities. Any further reduction in fares is now impossible without bringing a serious curtailment and impairment of service, which, on the contrary, the receiver is anxious to extend and improve.
>
> The general service has been steadily and greatly improved during the receivership and is kept to as high an average as the revenue and other means at the command of the receiver allow.
>
> All revenue above that necessary to maintain the property and the service has been expended by the receiver in improvement of the service.

Injunction Denied Taxpayers

Fourteen Seattle Taxpayers Will Carry Case Against City to the State Supreme Court

The Supreme Court of the State of Washington will now be called upon to adjudicate the powers of the city and the rights of taxpayers in the controversy as to whether taxes may be levied for the support of the municipal street railway. Superior Judge J. T. Ronald has denied the injunction asked by the fourteen taxpayers to prevent the city from invading the general tax fund for the railways, and the attorneys for the taxpayers immediately announced their intention to appeal the question to the Supreme Court of the State, so that that body may interpret the statutes of the state pertaining to the subject.

DECISION FROM ANOTHER SOURCE

Almost simultaneously with Judge Ronald's decision, Federal Judge E. E. Cushman in the United States District Court modified the form of decree entered in the Puget Sound Power & Light Company's suit against the city to compel specific performance of the contract of purchase, giving a broader interpretation of the jurisdiction assumed by the federal tribunal over the financial obligations of the street car system. This modification would permit the city to seek a further modification in the future, in event some right or contingency should appear which might require such change, attorneys state.

In dismissing the injunction proceedings of the fourteen taxpayers, Superior Judge Ronald said that the Court was of the opinion that the city did not intend to use taxes previously raised nor to levy additional taxes, and that the gross revenues of the company were sufficient to meet all its obligations.

Judge Ronald also issued a memorandum opinion, setting forth his findings in the case, in which he expressed the belief that the street railway system will pay its own way, that there will be no necessity for a diversion of funds, and that the law will not presume that the City Council will do an unlawful act in the future. In explaining his opinion, Judge Ronald said that without doubt there is now enough money set aside from the revenues of the system to pay the principal and interest accruing March 1, and to reduce the outstanding warrants and place the system on a cash basis by April 1.

FINANCIAL CONDITION IMPROVED

The Judge held that the financial condition of the street railway has greatly improved since the lines were purchased by the city, and that, not taking into account replacements, the city will be able to defray out of the revenues the cost of operation and maintenance and meet the installments of principal and interest, and also to reimburse the various other city departments for services rendered.

If the city should fail to meet the operation and maintenance expense it has, according to Judge Ronald, power to borrow from the general fund or to levy a tax direct, provided the limit of taxation is not exceeded.

Objections to all parts of Judge Cushman's decree were formally filed by the city, and in each case were overruled by the Judge. The objections were based upon the contention that the decree is contrary to equity and good conscience, and because it attempts to settle the rights of the parties concerning matters in respect to which no notice had been served on the city, and that it would impose upon the city obligations which are beyond the city's power and which are prohibited by the constitution and statutes.

Employees' Dividend Plan Proposed

T. E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, has presented a new suggestion for the advancement of the co-operative plan for employees of the company, which will be submitted to the stockholders for approval. President Mitten proposes that co-operating employees receive a co-operative dividend. Under the plan this dividend would be limited to the added net income produced, but it is not to exceed 10 per cent of the payroll of the company. The dividend payment to employees would follow the payment first of the 6 per cent company dividend. In his talk in proposing the plan, Mr. Mitten said:

> This plan will in effect make P. R. T. a stock of preference, the 6 per cent dividend on which is underwritten by men and management, who must reduce 1922 operating costs not less than $1,500,000 in order to make possible a co-operative dividend to employees equaling 10 per cent of the P. R. T. payroll.

Grand Rapids Franchise Under Way

City Attorney Taggart, Grand Rapids, Mich., and Attorney Knappen for the Grand Rapids Railway have started the tentative draft of a franchise that would limit the company's earnings not to exceed 8 per cent. City and company officials have been working together for more than a year on a basis for a franchise.

The proposed franchise must be passed first by the special street railway committee, then by the commission as a whole and last by the electorate before it becomes effective.

It was explained that 8 per cent had been considered because it was justified under present conditions and had been upheld by commissions and courts. In the event of a long-time franchise being granted it would be necessary to allow for a revaluation every five years, said Service Director Wagner, which seemed agreeable to the company. Then, he said, the valuation or the amount on which the company was permitted to earn money could be readjusted to meet changed conditions.

Coupled with this, it was explained that money for thirty years could be obtained at a smaller cost for interest than for a shorter period and that it was customary to grant a franchise for the same length of time bonds were issued.

Fire Wrecks New Orleans Offices

A fire of unknown origin destroyed the upper stories of the four-story building at Baronne and Common Streets, in New Orleans, occupied by the New Orleans Railway & Light Company, as general headquarters. The fire started in the room in which the records were stored, but most of these are said to have been saved. The damage to the building and to fixtures and to stocks of gas and electric light supplies is estimated at $100,000. The company has established temporary headquarters at 421 Baronne Street.

Whether the building can be restored or may have to be condemned is a matter which awaits the report of the Fire Prevention Bureau, now instituting an investigation. The structure has for some time been inadequate to the demands of the company for space, and it is currently reported that those interested are considering building a modern office and salesroom upon the old site in the event that the building is condemned.

$250,000,000 More for New York Subways

Chairman George A. McAneny of the New York Transit Commission discussed the work of the commission at the Feb. 6 lecture of the Industrial Forum which is conducted by the Polytechnic Institute of Brooklyn, N. Y. Within a week or two, he said, the plans would be announced for new subway construction to cost $250,000,000. At the top of the list was the Staten Island tunnel, to connect the Fourth Avenue and Bay Ridge Subway with the Staten Island trolley system. This would cost about $25,000,000. He also hinted at a cross-town subway to connect Long Island City with Borough Hall in Brooklyn.

The money for these new subways will be raised, it is expected, by making such savings in the operation of the present subways that the $264,000,000 of city credit tied up because of constitutional limitations will be released and the city can borrow money for the new subways.

He defended the "barometric" scheme which is part of the plan proposed by the commission for the unification of all New York City transit lines. It would be both an economical and political folly to fix a 5-cent fare indefinitely and this scheme permits changes in the fare after all proper precautions have been taken.

In closing, Mr. McAneny referred to certain "dreams" of those who proposed to pull down all the elevated structures and tear up the surface tracks. It would cost $500,000,000 to buy these old systems and put in anything different and not a single new seat would be added to the city's transit system. The only remedy is the construction of new subway lines, he said.

Proxies Sought in Philadelphia

Opposing Factions There Said to Be Seeking Alignment for Test of Strength

Financial Philadelphia has a new topic of conversation. It is the question of what is going to happen at the annual meeting of the Philadelphia Rapid Trasit Company on March 15. It will be recalled that some months ago President Thomas E. Mitten announced that he would seek this year a change in the status under which he serves the company. His original contract is said to have run out about a year ago. It is understood that since then he has served without a formal agreement.

The news that Mr. Mitten desired a change created considerable discussion at the time, but as the matter was not to come up for settlement then it lost significance as a piece of news. Discussion of that matter has, however, been provoked anew by the recent plea for support made to the stockholders of the company by a committee of directors composed of Jeremiah J. Sullivan, Charles J. Matthews, William Y. Tripple, Frank Buck and William J. Montgomery, some of whom have been quite outspoken about what they have termed one-man control, reiterated in the newspapers as opposition to domination of the company by Mr. Mitten. A statement which they have issued says:

> Under the existing by-laws of the company the business has been conducted without consultation with board of directors and many important steps have been taken without their previous knowledge. This method of conducting the business of the company is in our opinion, not satisfactory either to the city or to the stockholders, and changes should be made in the by-laws so that the board of directors shall have a real part in the management of its affairs.

Coincident with this movement unusual activity has been noted in the stock of the company, 13,000 shares having changed hands in one day recently with the price pushed up to 24, the highest quotation recorded since 1920.

While there has been no hesitancy to talk on the part of some of the members of the committee seeking proxies, Mr. Mitten has chosen to remain silent. The newspapers have of course been persistent in their quest for news and have filled many columns with stories about the matter, a great deal of it pure conjecture. Of all the statements printed, however, none has, perhaps, attracted greater attention than the following, issued by Drexel & Company in response to repeated demands upon the banking house for a statement:

> Our attention has been called to a contest for control which has arisen between those directors who are known as the stockholders' directors and the management of the company, and this statement is made in response to a question as to what position we occupy with regard to the company and its directorate.
>
> While we have not the slightest personal interest in the result of the contest, nor are we in any sense principals thereof, our sympathies, by reason of our business relationship as bankers, as before stated, are with those directors who are seeking to operate the company under the control of a board of directors rather than with those who are seeking to operate it under what is popularly known as a "one-man control."
>
> Such shares of stock as we ourselves happen to own, or in which we are interested, we would, therefore, vote in favor of Messrs. Montgomery, Buck, Matthews, Sullivan, Tripple and the policies which they represent.

A large stockholder-director is quoted as follows:

> The first intimation the directors had of the employees' profit-sharing plan was when they read it in the newspapers. Mr. Mitten likewise failed to consult the board when he purchased the Burd property for amusement-park purposes. The action of the Board of Directors in seeking proxies against the Mitten management is due to the stockholders' desire for a few dollars in dividends instead of the money all going out for expenses and salaries. The stockholders feel there should be reduced expenses in the management of the company, and that the money should be conserved so as to help pay some interest on their investment.

While all this talk has been going on rumors have been revived about the resumption of dividend payments by the company. It is said that it is proposed to pay a dividend of 3 per cent next July for the period of six months ending June 30, 1922. Since January, 1920, no dividends have been paid. The former yearly rate was 5 per cent.

Would Allow Service-at-Cost Fares

Legislation designed to authorize all cities except New York to enter into service-at-costs contracts with electric railway companies was introduced in both houses of the Legislature on Feb. 3. The bill defined a service-at-cost contract as an agreement between a municipal corporation and an electric railway whereby the fare shall be determined by the actual cost of service, plus a legitimate profit. All such contracts would have to be submitted to the Public Service Commission for approval.

Cleveland Employee Charged with Grand Larceny

Warrants for the arrest of four men were sworn out by the Cleveland (Ohio) Railway during the week ended Jan. 28 in an effort to end thefts that had caused the company hundreds of dollars' loss in the past several weeks.

One of the men arrested on the warrant was charged with grand larceny while three others were charged with receiving stolen property. The arrest of the four, according to company officials, will end thefts that have been going on for some time.

According to company officials, the man charged with the grand larceny was employed by the company. One of his duties consisted of carrying a fare box across one room. While doing this he discovered that the mechanism on the lock was faulty and that he could abstract tickets and cash from the box. Later he turned these over to the three men arrested for receiving stolen property. According to the company it required several weeks of effort on the part of secret service operators in the company's employ to detect the manner in which receipts were being lost.

Another Chicago Proposal Likely

Three lawyers hired by the local transportation committee of the City Council of Chicago, Ill., reported on Feb. 1 that the new ordinance plan outlined by Henry A. Blair president of the Chicago Surface Lines, could not be put into effect without action by the State Legislature. The attorneys gave a further opinion that another plan suggested by Alderman Schwartz could be made effective without any new legislation.

Both these plans have already been mentioned in the ELECTRIC RAILWAY JOURNAL. The Schwartz proposal calls for municipal ownership and operation of surface and elevated railways, the properties to be purchased by a new form of security. Mr. Blair's plan was based on service at cost with a rate of fare to give a 7 per cent return, providing for gradual amortization of the capital value, the city to take over when 50 per cent has been amortized. The special attorneys ruled that the City Council has no authority to guarantee a rate of fare which should provide a certain rate of return. President Blair went to New York after hearing this opinion and promised to make a further announcement in the near future.

Attorneys for the Surface Lines were scheduled to appear before the Illinois Commerce Commission on Feb. 9 at which time the fare case is to be reopened by the commission.

Politics Plays Part in Strike

The strike on the lines of the Virginia Railway & Power Company, Richmond, Va., which went into effect on Jan. 15 has passed from an operating state to a political state. The company has employed a sufficient number of men at the new wage scale and is giving practically normal service. Union men and their families are still forbidden to use the cars and many former electric railway employees still in uniform are operating unregulated and unlicensed jitneys with signs indicating that the fare is whatever one may care to contribute to the welfare of the men out on strike.

The City Council is in a deadlock on the issue of forcing the company to reduce fares from 6 cents to 5 cents. As a reprisal on the part of the city for the refusal of the company to arbitrate as demanded by the city council, the political issues of the strike will be fought out in the council primary of April 3. It is unlikely that any serious jitney regulation or any steps toward a new franchise will be taken before that date.

Per Cent Traffic Decrease Mis-stated—The United Railways, St. Louis, Mo., carried 282,447,190 revenue passengers in 1921 compared with 287,405,837 in 1920. This represents a decrease of 1.73 per cent. In the Jan. 21 issue of the ELECTRIC RAILWAY JOURNAL this per cent of decrease was incorrectly stated.

New York City Again Allowed Williamsburg Bridge Rights

In deciding that the Legislature has the power to grant to a municipality the right to operate a railroad, the Court of Appeals upholds the right of New York City officials to operate electric railway service across the Williamsburg Bridge. The decision states that no certificate of convenience is necessary, and that the right to operate such a line necessarily includes the right to build a spur to a carhouse, to maintain sidings and switches and to cross over the tracks which form a part of the Brooklyn Rapid Transit lines.

This decision is the latest step in a controversy which has lasted many months. As stated in the ELECTRIC RAILWAY JOURNAL for Dec. 31, 1921, page 1157, the Appellate Division of the Supreme Court, Second Department, denied the city the right to operate without first obtaining a certificate of convenience. This was a reversal of an order of the lower court which granted the city the right to operate cars in competition with the Brooklyn Rapid Transit Company.

Mayor Hylan and Commissioner Whalen have long promised that service over the bridge would be given at a 2-cent fare. Thirteen lines of the Brooklyn Rapid Transit Company operate through cars over the bridge without an additional charge to the regular 5-cent fare. The company also maintains a shuttle service across the bridge for which it charges 2 cents. This company and the Brooklyn City Railroad have definitely announced that they will discontinue their through bridge service when the New York municipal line begins operation.

Federal Judge Mayer recently instructed Lindley M. Garrison, receiver for the Brooklyn Rapid Transit Company, to cease operation of the shuttle service at that time too. Passengers will then have to change from the Brooklyn city cars on the Brooklyn side of the bridge to the shuttle line maintained by New York municipal authorities, pay an additional 2 cents, and on the New York side of the bridge change again to local New York city cars.

Rapid Transit Loop Only Solution to Traffic Problem

The need for and possibilities of a rapid transit system in Cincinnati, Ohio, were described in detail in an address before the City Club by Frank L. Raschig, associate engineer of the Cincinnati Rapid Transit Commission, who declared that the rapid transit loop was the most practical solution of the city's transit problems, both local and interurban. He said that the topographic conditions of Cincinnati and its environs seemed at first to present a problem much more difficult of solution than would have been the case in more level cities, but these very difficulties have presented a natural plan which would give at once excellent interurban and suburban rapid transit facilities.

In discussing the cost Mr. Raschig said that the estimated cost of the loop with 1915 prices was $6,000,000 and that was the amount authorized by vote of the people in 1916. Unfortunately, the war intervened and the work was not started until late in 1919. To build the complete loop as planned at present prices probably would take $11,000,000 and it would be necessary to go to the people for an additional bond issue. This cost is complete for operation, not, however, including rolling stock and provision for power. He added that rolling stock could be purchased out of operating receipts extending over a number of years and power purchased from the Union Gas & Electric Company, doing away with the necessity of separate power houses.

Power Program Under Consideration

The West Penn Power Company has applied at Morgantown, W. Va., for permission from the county court to construct power lines through Union district. It has also made a similar request in Preston county and has sought permission from the State Road Commission whereby it will be possible to cross public highways.

It is understood that the line is to run from the West Virginia state line via Chest Haven, Beaver Hole, Masontown, Kingwood and then on to Tunnelton and Rowlesburg. This route has been outlined to the State Road Commission.

Bold "Nickel" Snatcher Serving Two Years in Jail

Although union carmen (Amalgamated) made a hard fight to save him and are now seeking a parole, Harry J. Julin, former conductor employed by the United Railways, St. Louis, Mo., is serving a two-year sentence in the Missouri penitentiary at Jefferson City for the theft of $97.78 in fares. It is the first case of the kind that has ever gone to the Supreme Court. The verdict of the lower court was affirmed last November. Julin was one of the boldest car fare robbers among about 200 who have been discharged by the receiver in the last two and a half years. An example was made in his case. A dozen auditors worked up the evidence which showed that he filed down 7-cent tokens so that they would register as pennies, and filed-off nickels and dimes also to register as pennies. In a number of instances, the testimony showed, he held his hand over the fare box to prevent the passenger from depositing the fare, pocketing it himself.

One auditor after another, men and women, were assigned to the Julin case, and it required months of work to accumulate the evidence of the total thefts of $97.78. Notwithstanding a bitter fight by the conductor's union associates the jury returned a verdict of guilty and the Supreme Court upheld the verdict of the trial court.

News Notes

Service to Be Resumed.—The Public Service Railway, Newark, N. J., has informed the Board of Aldermen of Elizabeth, N. J., that cars will again be placed in service on the Fifth Street line. The traction company abandoned service on this line some time ago and is waiting for special work to be made.

Ask Commission to Explain Methods.—A resolution has been presented to the New Jersey Legislature requesting the Public Utility Commission to furnish the Assembly with data showing the commission's method of fixing rates, the percentage of the income consumed by state and municipal taxes, the percentage of income consumed for federal taxes and the percentage of operating cost to the revenues received from 1914 to date.

Maine Road Cuts Wages.—A flat wage reduction of 10 per cent on the Atlantic Shore Line in Maine, to go into effect on Jan. 31, has been announced by S. T. Dow, general manager of the company. About seventy-five employees will be effected. In Biddeford, Kennebunk and Sanford zones the fares will be cut from 10 cents to 5 cents on Feb. 11. One-man cars will be introduced between Sanford and Springvale and may be extended eventually to the entire system.

Proposed Electric Line Abandoned.—Negotiations for the construction of an electric railway over the right-of-way of the Buffalo & Susquehanna Railroad, service on which has been discontinued for some time, have according to C. A. Finnegan of Buffalo, N. Y., owner of the right-of-way, been abandoned. Lack of interest displayed by the residents along the way was his reason for abandoning the project. The road was purchased by Mr. Finnegan during the war from the Goodyear interests. It is still hoped by some that the road will be electrified.

Old Wage Schedule Ordered to Be Continued.—In a majority report submitted to the Department of Labor at Ottawa, Ont., the board of conciliation, which investigated the wage dispute between the Hull Electric Railway and its employees, has recommended that the wages continue as set forth in the award of the board of conciliation, dated Aug. 26, 1920, which was accepted by both the employing company and the employees. The judgment of Aug. 26, 1920, placed the wages at from 40 to 60 cents an hour, according to the class and length of service of the particular employee. At the hearing of the present board the employees complained that the company had violated the statute by reducing wages "after a dispute had arisen and before a pronouncement thereon by this board.

Financial and Corporate

$5,043,471 Plowed Back

Railway and Light Company at Columbus, Ohio, Returns This Sum to Capital in Three Years

All members of the board of directors of the Columbus Railway, Power & Light Company, Columbus, Ohio, were re-elected by unanimous voice at the recent annual meeting. One of the surprises of the meeting was that all the proxies held by W. A. Gill, Columbus, one of the staunchest supporters of the former management, were cast for the re-election of the directors. These last are: Charles L. Kurtz, Norman McD. Crawford, D. Meade Massie, Emil Kiesewetter, Clarence C. Slater, Walter B. Beebe, William C. Willard, A. S. Hammond, Harry S. Holton, William A. Gill, Ben W. Marr, Eugene A. Reed, Frank L. Stein and James B. Hanna.

Action on the part of the officers in preparation for the extension of railway service to the northern suburb of Clintonville was approved, a resolution also being adopted authorizing and approving a contract entered into on Jan. 6, giving the Columbus, Delaware & Marion Electric Company the right to use the rail-light tracks on Indianola Avenue on the North Side to Town and Third Streets, in the main business section.

FINANCIAL CONDITION IMPROVING

A constantly improving financial condition is reflected in the report submitted at the meeting by President Kurtz, in which formal announcement was made that the board of directors plans to resume payment of dividends, if approved by stockholders at a special meeting scheduled for Feb. 21.

President Kurtz said:

> The slow but sure upbuilding of the property, service and income tended to increase the company's credit until it was possible to secure a $3,000,000 three-year, 8 per cent underwriting or financing the first of June; and so, in this way the large note issue was absorbed and the seeming last financial danger so long threatening disaster was averted. It was the great amount of these notes, so many times renewed without a single payment made thereon, that required a sinking fund, into which all net earnings above operating needs, interest and depreciation had to be deposited, that operated to defer the resumption of dividends to stockholders.
>
> The continued, sure and steady restoration and upbuilding of your properties with corresponding increase in both service and income have naturally given to the company a better standing and credit at home and abroad.

The report shows that during the past three years $5,043,471 was invested in improving and enlarging the various branches of the service. The company has purchased 6 miles of track of the Columbus, New Albany & Johnstown line, contracted to purchase more than 6 miles of track from the Columbus, Delaware & Marion line; spent $995,705 for new track construction, special track work and moving poles, spent $611,427.61 in building a new conduit system to comply with an order of council, increased the capacity of the Big Walnut power plant; built and rebuilt substations, and extended transmission lines at a total cost for these alone of $3,436,338.

American Bankers Finance Paris Municipal Railway Undertaking

Kuhn, Loeb & Company, New York, N. Y., headed a syndicate which offered for subscription recently $25,000,000 of Department of the Seine (France) twenty-year 7 per cent external gold bonds, due Jan. 1, 1942. The bonds were offered at 90½ per cent of par. The department of the Seine is by far the greatest in wealth and population of the eighty-nine departments into which France is divided. It comprises the city of Paris and its residential and industrial suburbs. The present loan and a sterling loan to the amount of $12,500,000 are being contracted to provide funds for capital expenditures for the betterment and extension of the newly acquired transportation system. The bankers explain that the proceeds will be used entirely for productive purposes.

$500 a Day Gain in Toledo Receipts

The report of operation of the Community Traction Company, Toledo, Ohio, for the month of December was one of the best that has been made to the Street Railway Board of Control by Commissioner Wilfred E. Cann. Following the presentation of the report Mr. Cann announced that the order of Safety Director Gilson D. Light barring buses from downtown routes would probably increase the revenues of the railway by nearly $20,000 a month.

Although the first few days of December showed an average gain in receipts of approximately $700 a day, the average for the entire month ran about $500 over the previous month's average daily business.

A large part of the increased revenue will go into the fare stabilizing fund and help eventually to decrease the fare. The commissioner believes that a reduction in fare may become possible some time during the summer if conditions continue as at present. A swift betterment of industrial conditions would of course serve to hasten the fare reduction.

Since the buses have been ruled out of the congested traffic district, extra trippers have been put into service by the Community Traction Company and the operation of several car lines has been readjusted.

The first year of operation under the service-at-cost plan ended on Feb. 1.

Indiana Merger Approved

Commission Authorizes New Corporation to Issue $17,496,000 in Securities for Purchase of Properties

The Indiana Electric Corporation, a merger company of seven electric utilities of the State, was authorized on Jan. 26 by the Public Service Commission to issue $17,496,000 in securities to purchase properties connected with the deal.

The action of the commission constitutes approval of the merger plan and financial transactions outlined by the company as incident to the proposed merger.

RAILWAY AND POWER COMPANIES INCLUDED

Companies which will enter into the merger, under the order of approval, as previously stated in the ELECTRIC RAILWAY JOURNAL, are the Merchants Heat & Light Company, Indianapolis; Elkhart Gas & Fuel Company, Valparaiso Lighting Company, Indiana Railways & Light Company, Kokomo; Wabash Valley Electric Company and Cayuga Electric Company. The first three companies are already owned by the corporation.

The Joseph R. Brewer interests are behind the merger. The petition of the company, which asked for approval of securities amounting to $18,496,000, was the second to come before the commission. A previous petition, asking approval of the issuance of $21,000,000 in securities, was denied by the commission.

Commissioner George Barnard, who presided at the hearings and who wrote the order refusing to grant the first petition, dissented from the order of the commission approving the merger. Commissioner Barnard prepared a tentative order disapproving the plan for a second time, but the order was not approved by the commission. The other commissioners then wrote the order which was issued.

The $17,496,000 in securities authorized by the commission is distributed as follows: Bonds, $13,296,00; notes, $700,000; preferred stock, $1,500,000, and common stock, $2,000,000. A total of $2,250,000 of the bonds is to be refunded by the sale of preferred stock. The value of the properties, as found for the purpose of purchase and sale, is $17,500,000. This valuation includes physical property, $16,000,000; working capital $600,000, and going value, $900,000.

VALUE NOT FOR RATE MAKING

Members of the commission said it is stipulated that the values found in the order are not to be considered in any rate case.

The commission announced that a central power plant of the company is to be erected in the coal fields along the Wabash River.

Action by the commission on the original application was reviewed in the ELECTRIC RAILWAY JOURNAL at the time the decision was rendered.

Toronto Hearings Postponed

Deficit of Ten-Year Operation of 22.5 Mile Municipal Lines Shown to Be $1,420,000

The Toronto Railway Arbitration Board, after sixty-four days of hearings, from Sept. 12, 1921, to Jan. 27, 1922, adjourned until March 14 at the request of the city of Toronto in order to give the city time to complete the preparation of its case.

On the sixty-fourth day of the arbitration Mr. Drum of A. L. Drum & Company, consulting engineers, Chicago, completed his testimony with respect to the going concern value of the property of the Toronto Railway. He contended that $1,558,574 was a fair amount to represent the going concern value, basing his estimate on the cost of bringing the property to the status of an efficient operating concern.

The evidence presented introduced a new element in valuation cases, as proof was offered that the tracks and equipment of the Toronto company were suitable, adequate, efficient and economical of operation; that all of the seventeen car routes but one in the city were properly located and efficiently operated and that each of these routes not only afforded proper and adequate service through the territory it served but was profitable and economical as indicated by the number of cars operated, schedule speeds and passengers carried.

Mr. Drum said it was unusual to find in a city of 500,000 population only one route out of a total of seventeen that was unprofitable, particularly as this one route involved only three cars out of a total of 663 cars operated by the company and included less than 0.4 per cent of the total car miles. Among the data submitted in support of this argument was the complete detail of the operating statistics of the routes for eight months ended Aug. 31, 1921, a condensed table of which is published herewith.

It was further contended that the Toronto Railway, as acquired by the city of Toronto, was a very profitable going street railway system and the owners of the property were entitled to a substantial allowance for the cost of bringing the property up to its present efficient state of operation. In support of this claim Mr. Drum submitted an analysis of the results of operation for the eight-year period 1913 to 1920 and reduced to a unit basis for comparison with results found in eight cities in the United States having about the same population as Toronto. These data are published herewith.

To illustrate the loss during the development period of a street railway system and to show the benefit to Toronto of unification of the municipally built lines in Toronto with the Toronto Railway system (now a part of the municipally owned lines) Mr. Drum submitted an exhibit showing the operating deficits by years covering the entire period of operation of the Toronto Civic Railway (the system built by the city) up to Aug. 31, 1921, the time the city took over the property of the private company. A summary of this exhibit, published herewith, shows that the municipal system has never earned interest on the investment in any year, and that the total deficit from operation during the ten-year period of its operation has been $1,420,084.

OPERATING STATEMENT OF THE TORONTO CIVIC RAILWAY FOR THE CALENDAR YEARS 1911 TO 1921 INCLUSIVE

Year	Bonds Outstanding at End of Each Year	Gross Revenue from Operations	Operating Expenses	Net Earnings from Operations	Interest and Sinking Fund	Net Deficit
1911 (Six months)	$1,157,293	.....	......	......	$39,017	$39,017
1912	1,296,781	$1,073	$557	$516	87,611	87,095
1913	1,486,603	59,557	56,608	2,949	98,297	95,348
1914	1,552,091	167,000	161,993	5,007	100,338	95,331
1915	2,116,748	199,289	202,663	†3,374	142,647	146,021
1916	2,116,748	224,994	194,302	30,692	146,988	116,296
1917	2,412,478	278,346	252,511	25,835	160,579	134,744
1918	2,422,748	333,882	297,879	36,003	171,327	135,324
1919	2,626,748	443,575	397,632	45,943	181,569	135,626
1920	2,626,748	543,571	551,658	†8,087	200,129	208,216
1921 (Eight months)	2,626,748	397,720	491,484*	†93,764	133,302	227,066
Total	....	$2,649,007	$2,607,287	$41,720	$1,461,804	$1,420,084

* No taxes included in operating expenses except for the eight months 1921, which includes $10,073 taxes on carhouse. † Loss.

OPERATING STATISTICS OF THE TORONTO RAILWAY

Results of Operation for the Eight-year Period 1913 to 1920 Reduced to a Unit Basis for Comparing Results in Toronto with Results Found in Eight Cities in the United States of About the Same Population.

	Population per Square Mile 1920	Revenue Passengers per Mile of Single Track	Revenue Passengers per Car Mile	Maintenance of Way and Structures per Mile of Single Track	Maintenance of Equipment per Car Owned	Kw.-Hr. per Passenger Including Transfer
Toronto	16,786	1,184,077	7.74	$1,312	$637	0.296
Minneapolis	7,650	593,320	6.99	1,182	452	0.443
St. Paul	4,437	459,596	6.23	1,269	566	0.574
Cleveland	14,219	715,813	8.84	* 3,317	747	0.355
Kansas City	5,729	426,371	5.26	* 2,179	705	0.610
Cincinnati	5,639	462,846	5.30	1,394	391	0.352
Buffalo	13,004	326,066	5.99	1,634	582	.....
Baltimore	9,289	513,228	6.48	1,376	302	.....
St. Louis	11,851	545,688	5.75	1,679	685	.....
Average	9,845	580,778	6.51	$1,705	$563	0.439
Average, excluding Kansas City and Cleveland				$1,406	$516	

* Includes allowance for renewals and replacements.

OPERATING STATISTICS OF THE TORONTO RAILWAY BY ROUTES FOR THE EIGHT MONTHS ENDED AUG. 31, 1921

Name of Route	Maximum Number of Cars Operated	Revenue Passengers	Car Miles	Maximum per Hour Running Time	Passengers per Car Mile
1 Avenue Road	33	6,524,561	595,401	8.28	10.958
2 Ashbridges Bay Route	3	94,743	55,328	9.60	1.712
3 Bathurst	38	6,318,451	898,765	8.85	7.030
4 Bloor	49	8,531,992	915,581	9.28	9.138
5 Broadview	33	6,714,156	616,678	9.03	10.884
6 Carlton	40	9,098,638	1,086,183	9.62	8.375
7 Church	18	2,871,545	367,307	8.20	7.817
8 College	42	6,907,031	793,585	9.50	8.703
9 Dovercourt	18	2,914,815	382,672	9.11	7.613
10 Dundas	45	12,833,504	1,201,756	9.37	10.671
11 Dupont	18	2,926,234	380,360	8.45	7.693
12 Harbord	43	6,094,371	885,549	9.74	6.882
13 King	102	17,775,377	2,666,690	10.20	6.666
14 Queen	86	20,727,244	2,068,834	9.28	10.018
15 Belt Line-Sherbourne	17	7,166,223	973,554	8.82	7.361
Belt Line-Spadia	22			8 82	7.361
16 Winchester	12	1,953,115	230,563	8.46	8.471
17 Yonge	44	11,566,720	894,604	7.95	.918
Total	663	131,018,720	15,013,410		
Average	37	7,278,817	834,078	9.03	8.727

$100,000 Involved in Tax Levy Suit

A hearing has been granted by the State Supreme Court of Washington of the case of the city of Seattle and the Puget Sound Traction, Light & Power Company against the state, in which the plaintiffs are seeking to secure cancellation of a $400,000 tax assessment against the railway lines. The case has been put down to be heard at the May term.

The assessment was made on March 15, 1919, fifteen days before the city took over the railway lines, and was invalidly levied, it is contended by the city and traction company. It is customary to levy taxes for the following year in June, while in this case, it is contended the date was advanced to March, because the city was to take over the lines on the last of the month.

In the event that the tax is held valid, the traction company's share will be $100,000. Had the tax been assessed at the usual time of the year, the following June, there would have been no assessment against the city, as the municipally-owned lines were not subject to taxation, it is contended

The King County Superior Court sustained the validity of the levy, and an appeal was taken to the Supreme Court.

$128,946 Loss in Cleveland

This Is on Basis of Ordinance Allowance—Actual Surplus Was $600,158

The Cleveland (Ohio) Railway finished 1921 with an actual surplus of $600,158 although on the basis of its service-at-cost ordinance allowances there is shown a deficit of $128,946 for the year. That is just one high light shown in the company's annual report submitted to its stockholders at the annual meeting on Jan. 25. The difference between the ordinance deficit and the actual surplus is represented mostly in the big saving affected by the company in its operating allowance, due to wage and salary reductions and other economies.

Although the company's riders during 1921 show a falling off of 11.42 per cent as compared with the year previous, still the passenger revenue showed an increase of 1.47 per cent, due largely to the fact that the company operated at the maximum rate of fare—6 cents, plus 1 cent for a transfer—during the entire year of 1921 while in 1920 it had this maximum in effect for only one-half year.

The number of riders for 1921 totaled 399,429,666 as compared with 450,925,677 for 1920. Passenger revenue in 1921 amounted to $17,277,266 as against $17,027,522 for 1920. The number of car miles run in 1921 was 35,283,902 as against 38,774,682 the year previous. The company's total gross income in 1921 was $17,797,947, while its actual expenditures amounted to $17,197,788.

$2,100,731 TO STOCK AND BONDHOLDERS

For injures and damages in 1920 the company paid out the sum of $1,216,948, while for taxes the company's total was $1,181,143, which is an increase of 9.14 per cent over the year previous.

As the amount of money paid the stock and bondholders in the company totaled for the year $2,100,731, it can be seen that the taxing bodies and the claimants for injuries and damages received more money than the people who, by the investment of their money, made the railway possible.

In his annual report to the stockholders John J. Stanley, president of the company, pointed out that during 1921 there were no additions to the company's rolling stock and that no betterments were made during the year "save those involving so small an expenditure of capital that they could be paid for with the money realized from retirement of obsolete property, or in two instances, paid for by private individuals interested in having them made." He also pointed out that wages and salaries of employees were reduced 10 per cent during the year while there was substantially a 20 per cent decrease in the wage scale for conductors and motormen.

Salient paragraphs from Mr. Stanley's report follow:

> The fare was at the maximum throughout the year. We earned expenses, taxes and interest. The number of passengers decreased greatly, but the city lessened the service and we were able to give the service demanded without suffering loss.
>
> The decrease in riders was continuous throughout the year, in January slightly more than 4 per cent and in December nearly 9 per cent, but it was apparently checked during September, close analysis of the figures showing that while the decrease continued it was at a less alarming rate.

Mr. Stanley explained that the city was loath to believe that this decrease in riding was permanent, and it was not until May that its service demands were appreciably less than in the year previous. But from that time on, the service was adjusted rapidly to the lessened demand; so that, despite the large decrease in the number of riders the company was enabled to complete the year with an actual profit and but a small deficit in the ordinance allowances. He says:

> Our operations for the year from an operating standpoint were satisfactory. The service given was the best possible at the costs we had to meet; we maintained the property; and, when the final adjustment of accounts is made at the end of the ordinance year, Feb. 28 next, it will be found that we lived within our income.
>
> But from the standpoint of growth, of continued development of the property, of anticipating and equipping ourselves for the demands of next year's car-rider, the giving of "the best street railway transportation at cost," we suffered a real loss. The failure in 1920 of the effort to make our stock salable at par by increasing the interest rate to 7 per cent, as provided in the amendment adopted by the Council and rejected at the referendum election on Aug. 10 of that year, together with the offering on the market of equally sound securities bearing a larger rate of return than 6 per cent, has made the financing of any extensions or betterments under the limitations of our franchise impossible. And those limitations remain.

Mr. Stanley next said that the amounts paid by the company to the federal government in taxes on its income have been so large since 1917 as to raise the question whether or not the company should not be exempt, because of the peculiar conditions under which it operates, from the appliance of the same rule to it as is applied to every other corporation. He says that late in the year, through the interest of the city street railroad commissioner, the company received authority from the city to present the matter to the proper department of the federal government to the end that a refund of all or part of the sums paid be had and relief granted as to future levies. Steps are being taken to secure a hearing. In continuing he said:

> While the cost of accidents was less than the cost in 1920, it was so large that we have consolidated in one department all of our efforts to eliminate the causes of accidents. The company is hopeful, on the showing made in the last few weeks that the coming year will be a safer and less expensive year than any of recent times.
>
> The number of riders carried daily is still many thousands less than the high average set in 1920, but the closing months of the year seem to indicate a gradual, though slow, return to the old traffic demand. If, as we all hope, this continues, the present rate of fare, with the present service and costs, will be sufficient for our needs the coming year. But should there come a second and greater decrease in the number of passengers, it will be followed by a lessened service. This year's experience justifies confidence for the future.
>
> A new Mayor and City Council are in office. The added pressure for extensions and betterments which the passing of another year, in which no real additions were made, should lead them to the early solution of the problem—how to enable us to obtain funds to pay for the city's transportation needs. Until the problem is solved, the policy which we were of necessity forced to adopt a year ago must be adhered to. I repeat what I then said:
>
> "Because of lack of funds that we may use on capital accounts, it is necessary, in our own interest, to cease altogether the spending of money for additional property, even such as ought really to be regarded as essential to the conduct of our business.
>
> "This, then, is the policy of your directors under present financial conditions. It is with regret that I announce this policy, because Cleveland needs extensions and betterments of its street--railway system. The growth of the city in population and area and the increase in the business of the company will not be as great in percentages as in some past years, but Cleveland will continue to grow and people will continue to ride on the street-cars in larger numbers. This growth ought to be met by service adequate to take care of it, and greater service calls for more tracks, rolling stock, buildings and power."

$1,000,000 of Stock Offered

Public of Portland, Ore., Invited to Participate in Ownership of Local Utility

One million dollars of 7 per cent prior preferred stock is being offered for subscription to customers and patrons by the Portland Railway, Light & Power Company, Portland, Ore. The purpose of the issue is to provide funds to carry out extensions and improvements included in the budget of the company to be made in 1922.

About a year ago the company offered for sale to home investors an issue of gold notes which was very quickly oversubscribed. As in the case of that issue, the advertising now being done in offering the stock for subscription is under the direction of W. P. Strandborg, publicity manager for the company.

For four days before the issue was advertised publicly it was brought to the attention of the employees, with the result that in these four days 1,100 employees subscribed for 1,737 shares wih a par value of $173,700. This notable achievement proved of great pulling power in connection with advertising the issue to the public. After noting the very favorable response of its own employees to the offering an advertisement of the company said:

> These 1,100 men and women—our employees—who have made this choice of an investment, are your friends and neighbors; you see and meet them every day; working loyally for their company on the cars, in our general offices, in our power plants, stations, in and around the scores of departments that make up this great utility.
>
> They are just like you; they know the value of thrift; they are on the lookout for a good, safe, income-bearing investment and they know a good one when they see it. Just as you do.
>
> That's why they selected our 7 per cent prior preference stock.
>
> That is why we say, if it is a good investment for our employees—it is equally good for you, our customers and patrons.
>
> Shares of this stock may be purchased either for cash or on the easy-payment plan, at 96 to yield 7.3 per cent, dividends payable quarterly.
>
> It is important to state, also, that this stock is superior both as to assets and earning power over all stock, both preferred and common, now outstanding.
>
> Moreover, it is an investment at home for our home people, so you can easily investigate what is behind the investment and your money will be put to work for you where you can watch it grow.
>
> A very desirable and attractive feature of the easy-payment plan is that we pay 7 per cent interest on all partial payments from the time these payments are made until your contract is completed.

Boston "L" Wants Its Bonds Made Legal for Savings Investments

The Boston (Mass.) Elevated Railway has asked the Massachusetts Legislature to make its bonds legal investment for the savings banks. They do not come within that classification at present because the law requires that in order to qualify there must have been a dividend payment of 5 per cent for at least five successive years.

The matter came up for a hearing during the week ended Jan. 28 before the legislative committee on banks and banking. James F. Jackson, chairman of the Boston Elevated board of trustees, told the committee that the elevated bonds should be considered safe for savings banks investment on account of the State guarantee of interest under the public control act.

Chairman Jackson told the committee that the company must have a large amount of money for new car shops and equipments to improve the service. It has bought the sites for car shops and needs $3,000,000 to erect and equip the buildings. It could save $350,000 by doing this work now. Its present equipment belongs to the days of horse cars.

If the bill which is before the Legislature were passed it would be possible for the Elevated to raise the new money it needs, said Mr. Jackson. He said that he believes the savings banks would invest in the new securities, because they are perfectly good with the State guarantees.

Aids Employees in Buying Stock

Employees of the Southern Pacific Company and proprietary companies, including the Pacific Electric Company, Los Angeles, Cal., whose lines form a part of the Southern Pacific transportation system, beginning Feb. 1, were afforded the opportunity to buy shares of the capital stock of the company on easy terms, according to a statement to employees issued by William Sproule, president of the company.

The plan provides that on application of the employee, the company will buy from one to fifteen shares of stock in the open market, deducting the purchase cost in small amounts from his monthly pay.

The company has no stock in its treasury. All of its stock is in the hands of the public (about 54,000 holders) and the present proposal is intended to make it easy for employees to buy Southern Pacific stock in the open market. The company, of course, cannot control the future market price of the stock or the amount it will be able to pay in dividends, as earnings largely determine that, it is stated.

The company will charge the employee 6 per cent interest on the cost of stock purchased for his account and will credit him with dividends paid on the shares held for him. Dividends have been paid regularly since June 30, 1907, at the rate of $1.50 a quarter or $6 a share annually at the market price of the stock, at present approximately $81.50. This rate of dividend gives a return of not quite 7½ per cent on the investment. Thus dividends will more than offset charges made for interest.

2 per Cent Additional on Extended B. R. T. Notes

The New York Transit Commission has approved the application of Receiver Garrison for an extension of the $16,000,000 receivers' certificates of Brooklyn Rapid Transit Company for one year, from Feb. 1, 1922, to Feb. 1, 1923. The interest rate will be increased from 6 to 8 per cent. In handing down its decision the commissioner said:

> In view of the losses incurred and sacrifices made by holders of traction securities and employees and the reduction of this debt by $4,000,000 and the general decrease in the cost of money, it is the very strong view of the commission that a 1 per cent discount should have been accepted as a maximum to be paid for the extension. The failure of the commission's efforts to secure such a concession indicated, however, that the court had already exhausted the possibilities of reducing the syndicate's demands.
>
> The commission is, therefore, faced with the alternative of approving the extension terms as presented or of disapproving them and thus subjecting to sale the transit properties covered by the lien of the certificates. Actually there would appear to be no alternative. A sale of these properties and further disintegration of the Brooklyn Rapid Transit system at this time would be a calamity.
>
> The existing situation must be preserved pending the working out of the commission's plans for the readjustment of transit. Therefore, despite its belief that the terms of the extension are excessive, the commission feels compelled in the public interest to recognize them as the price of keeping the system intact.
>
> The extension is, therefore, approved.

Operating Revenue Decreases $377,000—Expenses Go Down $100,000

A reduction of $377,000 in operating revenue, as against a decrease of only about $100,000 in operating expenses, is the summary, given by President Clark V. Wood of the affairs of the Springfield (Mass.) Street Railway in 1921. As against nearly 55,000,000 passengers carried in 1920, only 49,000,000 were carried in 1921. Reduction of traffic in the rush hours, due to industrial slackness, is found to be a large factor in the decline. While there was a saving in the use of power, because of lighter hauls and the introduction of many one-man cars, it was necessary to put $155,000 into car maintenance, outside of $119,000 spent for electrical equipment. Principal items in round numbers in 1921 were: operating revenue, $3,428,000; operating expenses, minus interest on funded and unfunded debts, $2,900,000; kilowatt-hours, 25,500,000; passenger car miles, 7,000,000; transfer passengers, 5,700,000.

Dividends paid by the Springfield Street Railway in the year amounted to 8 per cent. The Springfield Railway Companies, the holding company, declared a dividend of 4 per cent on preferred stock. The New England Investment & Security Company, having holdings in this and other Massachusetts companies, also declared a dividend of 4 per cent.

There is no immediate prospect of a reduction of fares, which now stand at 7 cents, but President Wood says that as soon as receipts are sufficient to pay expenses and give a fair return on the investment service will be improved, road improvements instituted and fares lowered.

Preferred Stockholders Enter Protest

The organization of a committee, representing the preferred stockholders of the American Cities Company, many of whom live in New Orleans, was effected on Feb. 4, according to an announcement in the local paper. Samuel A. Trufant, a local investment broker, has been elected chairman.

The movement appears to portend a conflict of interests between the preferred stockholders and the bondholders of the company, at the approaching sale, on Feb. 23 of all the securities in the six Southern utility companies controlled by the American Cities Company. Mr. Trufant makes a strong protest against the plan proposed by the bondholders for the reorganization of the company.

The statement made by Mr. Trufant was in part as follows:

> In a word, the bondholders' plan amounts to a practical "freezeout" of the preferred stockholders and unless some concerted action is taken in their behalf to prevent the proposed reorganization the preferred stock will represent only an unpleasant memory in this community.
>
> If any plan of reorganization is proposed whereby the equity of the preferred stockholders in the assets is given fair consideration, I feel sure that the large majority of the holders of the preferred stock, of which there is $20,500,000 outstanding as against $7,500,000 of the bonds, would be quite willing to co-operate.

The bondholders' committee a week ago announced that holders of preferred stock in the American Cities Company would be offered "the right to subscribe to a certain amount of income bonds and common stock of the National Power & Light Company," the successor company.

The general plan for the reorganization of the company has been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Decrease in Expenses in Seattle

In its report of operations for November, 1921, the Seattle (Wash.) Municipal Railways shows a decrease in its total expenses of $27,751 over the same month in 1920. For November, 1921, the expenses were $348,590 against $376,341 in November, 1920, the total revenue increased from $472,955 in November, 1920, to $525,040 in November, 1921.

Mr. Nash an Omaha Director.—L. C. Nash has been elected director of the Omaha & Council Bluffs Street Railway, Omaha, Neb. He is president of one of Omaha's leading mercantile establishments.

Financial News Notes

Kalida Mayor Wants Line Operated.—Mayor S. H. Stevens of Kalida, Ohio, has filed a motion in federal court at Toledo for a rehearing of the petition of the receiver for the Indiana, Columbus & Eastern Traction Company to abandon service on the Defiance and lower divisions of the road. He claims it will leave Kalida without any form of transportation.

Common Stock Dividend Declared.—The Twin City Rapid Transit Company, Minneapolis, Minn., has announced the declaration of a dividend of 2 per cent on the common stock for 1921, payable on Feb. 10, to stock of record Feb. 3. In 1921 the company paid 3 per cent and in 1920 2½ per cent. Formerly the company paid a quarterly dividend of 1¾ per cent.

Seeks Temporary Suspension.—The San Francisco-Oakland Terminal Railways, Oakland, Cal., has petitioned the State Railroad Commission for permission to suspend operation on its San Pablo Avenue line in Richmond. The request is made for ten years. Recently the commission permitted a suspension of service on part of this company's system at El Cerrito.

Receiver Appointed.—J. L. Brassell has been appointed receiver of the Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga., upon a bill in equity presented by the trustee of the bonds issued by the company. The bill states that on Jan. 1. payment of principal was not made on bonds amounting to $42,000, which had been issued five years ago and matured on Jan. 1. The line operates between Fairburn, Union City, Red Oak and College Park.

Municipal Shuttle Line Discontinued.—Because of the small receipts one municipal car line at Detroit, Mich., has been forced to discontinue its service. The line, which connected the Twelfth Avenue city line with Livernois Avenue, has been operating with two cars. The daily receipts have averaged about $4. About 1½ miles of double track are involved in the line discontinued. The line was operated as a shuttle in connection with joint operation on the Trumbull line.

Walla Walla Lines Reported Sold.—The Walla Walla (Wash.) Traction Company, a subsidiary of the Pacific Power & Light Company, is reported to have sold its 27 mile interurban electric railway system to the Northwestern Improvement company, a subsidiary of the Northern Pacific Railway. The electric railway lines purchased cover the city of Walla Walla, with a main line running to Milton and Freewater and a few short branches into orchard districts. The consideration paid and terms of payment were not announced.

Third Rail Line Sale on March 16.—March 16 is the date finally set for the sale of the third-rail division of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., necessitated by the petition filed by the Northern Trust Company, Chicago. If the highest bid received is not sufficient to cover the amount required, the balance will be cared for by attaching a lien on the Fox River, Elgin & Aurora city lines. This provision was made by the court in arranging for the sale, which is to be held at Wheaton.

Maine Company Doing Better.—The gross income of the Cumberland County Power & Light Company, Portland, Me., for the year ended Dec. 31, 1921, was $3,305,110, compared with $3,114,008 for the previous year. The net income for the year was $364,399, as compared with $303,691. In 1921 preferred stock dividends were $241,500 while no such payment was made in 1920. The surplus for 1921 was $122,899, as compared with $303,691 the previous year. The Portland Railroad, operated by the company, was operated at a deficit of $62,796 in 1921, compared with a deficit of $120,711 the previous year, after the payment in each year of $99,950 in dividends.

1,732,887 More Passengers in Vancouver.—The British Columbia Electric Railway, Vancouver, B. C., carried during 1921 1,732,887 more passengers on all lines than during 1920, the figures being 70,883,992 for 1921 compared with 69,141,105 in 1920. The city systems of Vancouver, Victoria, New Westminster and North Vancouver and interurban lines are included. Up to August, 1921, there was an increase in traffic on practically all lines, but since that time a falling off has been registered due to a number of industries being shut down. The system is running from 100,000 to 200,000 passengers a month behind last year.

$220,016 Accumulated Deficit for Municipal Line.—The Tacoma (Wash.) Municipal Street Railway accumulated during 1921 a larger deficit than in any year of its history, although the month of December showed an improvement, according to a report of City Comptroller John M. Roberts. During 1921 the deficit, including interest, depreciation and other charges, was $59,648, bringing the total deficit of the utility since its inception to $220,016. December came within $336 of paying the operating expenses alone, but the total deficit for the month was $3,654. The number of passengers carried in 1921 was only a little more than half the number during 1920, when 4,030,759 were carried.

Appeal Made for Approval of $922,000 Issue.—Attorney Philip G. Carleton for the Eastern Massachusetts Street Railway, Boston, Mass., has asked the commissioners of the Department of Public Utilities to approve the proposed issuance by the public trustees of the company of $922,000 in bonds to redeem obligations incurred by the company under the reorganization act of 1918, in extensions and additions to its property. Attorney Carleton also asked the commissioners to certify that the proceeds of the $2,000,000 in bonds authorized under the organization act have been properly expended by the company, in order that $408,000 held by the Old Colony Trust Company as trustee may be paid to the company.

Will Advance Equivalent of Coupons.—The committee representing the holders of the 4½ per cent general mortgage gold bonds of the New Orleans Railway & Light Company, New Orleans, La., has announced that it will advance through its depositaries the equivalent of all coupons to bondholders who have deposited or may deposit their securities with the committee. This announcement followed the declaration by Receiver O'Keefe recently to the effect that the company would not pay until April 1, 1922, the coupons of the 4½ per cent bonds due on Jan. 18, 1922. The receiver thus takes advantage of the period of grace which is given in the mortgage securing this issue of bonds.

$1,930,000 of Bonds Offered.—Halsey, Stuart & Company, Inc., and Paine, Webber & Company, New York, N. Y., are offering an issue of $1,930,000 Wisconsin-Minnesota Light & Power Company, LaCrosse, Wis., general and refunding mortgage 7 per cent gold bonds, series "A," at 99 and interest, to yield about 7.10 per cent. The bonds are non-callable for ten years and mature Jan. 1, 1947. The company owns and operates, without competition, a system of electric light and power properties, serving forty-nine communities located in western Wisconsin and eastern Minnesota. The property also includes 11½ miles of city railway lines in Eau Claire and 12½ miles of interurban railway connecting that city with Chippewa Falls.

Payment to City Establishes Record.—An increase of more than $500,000 in the gross receipts on the city lines of the Connecticut Company, Hartford, Conn., was indicated in a report received recently by City Clerk John A. Gleason. The figures show fares of $2,682,007 for the calendar year of 1921. For the calendar year 1920 the receipts were $2,144,194 resulting in the payment of $42,884 to the city and in 1919 the gross receipts were $1,714,177 for which the company paid the city $34,284. Under the provisions of the Tucker grant, the Connecticut Company is obliged to pay the municipal government an amount equal to 2 per cent of the gross revenue obtained from fares collected within the city limits. And on this basis with fares of $2,682,007 the city will receive $55,641 in comparison with $42,884 for the 1920 collections. In 1901 the fares paid within the city limits of Hartford totalled $527,498. The totals of gross fares collected within the city limits from 1915 to 1921, inclusive, follow: In 1915, $1,220,415; in 1916, $1,380,192; in 1917, $1,464,604; in 1918, $1,485,067; in 1919, $1,714,176; in 1920, $2,144,194; in 1921, $2,682,067.

Traffic and Transportation

State Versus City

City of New Orleans, Anxious to Put an End to Receivership, Is Opposed by State

I. V. Kittridge, city attorney of New Orleans, La., filed a brief in the State Supreme Court on Jan. 3, in answer to the application of State Attorney General Coco for an injunction to enjoin the Commission Council from passing an ordinance or doing anything to interfere with the 5-cent fare under the franchise of the New Orleans Railway & Light Company.

This case comes up on appeal from the Civil District Court for the parish of Orleans wherein Judge Parker refused the injunction asked by Attorney General Coco on the ground that the original application was premature.

The brief of the city attorney refers to the facts in the case already developed that the United States District Court last April enjoined the Mayor and the Commission Council from interfering with the collection of an 8-cent fare by Receiver O'Keefe, and that repeated meetings have been held with the view of terminating the receivership and granting some relief to the people of New Orleans from the present fare, electric light and other service charges.

BELIEVES CONFERENCE SHOWED EARLY TERMINATION OF RECEIVERSHIP

The conference showed, so City Attorney Kittredge declares, every indication of an early, advantageous and desirable termination of the receivership, all of which negotiations, it is stated further, have been stopped by the action of the State Supreme Court, in consequence of which desired relief has been denied the public.

In opposition to the contention of the State Attorney General, that the State had a right to enjoin the city from passing any ordinance or resolution; that the city was without rate making power; and lastly that the 5-cent fare provided in the franchise of the railway formed an inviolable contract, City Attorney O'Keefe cites from decisions of the Supreme Court of the State to show that the city has full police power to make rates.

A section of the city charter clothing the city of New Orleans with this authority, made part of the brief of City Attorney O'Keefe, is as follows:

> The city shall have all powers, privileges and functions which by or pursuant to the constitution of this state have been, or could be, granted to or exercised by any city.

City Attorney O'Keefe concludes a summary of the record in the brief as follows:

> We submit that the Attorney General cannot at this time enjoin the Commission Council of New Orleans from acting; that the Commission Council of the city of New Orleans is vested with full rate-making powers and that these powers have been preserved to it by the new constitution; and finally that the city, in the interest of the welfare of its people, has the right, by agreement with the railway company, to fix a rate of fare that will make it possible for the utility to furnish the necessary transportation and lighting service in New Orleans.
>
> The state could not possibly profit from the decision which it asks. It seeks to deprive the city of home rule, to place an unnecessary burden on the citizens of the municipality, at the same time securing no possible benefit or profit for the citizens of the balance of the State. What reason and what demand is there in law or in equity for this judgment to refer utilities operating exclusively in the city of New Orleans to the jurisdiction of the Public Service Commission, rather than to the Commission Council elected by the people of this city?

FEDERAL DISTRICT COURT GRANTS APPEAL TO U. S. SUPREME COURT

Another angle to the fight being made by Attorney General Coco against the 8-cent fare developed on Feb. 3 when Judge Rufus Foster, of the Federal District Court, granted the State's Attorney General an appeal to the United States Supreme Court, from the decree of Circuit Judge N. P. Bryan and District Judges Rufus Foster and H. D. Clayton, of Birmingham, Ala., restraining the Attorney General and his assistants from interfering with the New Orleans & Railway Company.

The appeal was based upon the contention of Paul A. Sompayrac, representing the State of Louisiana, that the injunction restraining the Attorney General and his assistants from bringing suit against the railway actually restrained the State, because the Attorney General is the only officer who has authority to appear for the State.

Five-Cent Fare Experiment Starts on Eastern Massachusetts Line

The Eastern Massachusetts Street Railway, Boston, Mass., has decided to experiment with a 5-cent fare. At the request of the Mayor of Chelsea the public trustees have voted to operate a 5-cent route between Chelsea square in Chelsea and Scollay Square in Boston, beginning Feb. 10. Ten-strip tickets have to be bought. The experiment is recommended by Superintendent Hardy of the Chelsea division.

In connection with this fare reduction on the line between Chelsea and Boston the trustees will experiment also with the Cleveland type of fare boxes which retain the tickets and cash fares until the boxes are opened at headquarters. The conductors will not handle any cash.

Company Conforms to Law.—According to a recent decision of Special Judge A. B. Anderson in the Criminal Court at Nashville, Tenn., the Nashville Railway & Light Company is meeting the requirements of the "Jim Crow" law in designating with regular signs the sections for the white and black respectively.

Report Commends International Railway

Operation and management of the Buffalo city lines of the International Railway Company, Buffalo, N. Y., are commended in a special report of the engineering department of the Public Service Commission. Although an exhaustive survey of traffic conditions was made by inspectors of the commission only two recommendations are embodied in the report. These are that seventy-two additional cars could be operated to make service adequate in the morning and evening rush hours and that several lines should be rerouted to avoid congestion in the heart of the downtown business district.

The report says that if the increased service which is suggested is supplied, the company still would have adequate reserve equipment. The overhaul of cars on a two years' basis and a general inspection of cars on a seven days' basis are called reasonable.

It is pointed out that an expenditure of $2,907,869 in the last four years has resulted in material improvement of the company's rolling stock, and it is declared the physical condition of the property never has been so good. The number of "pull-ins" is not considered excessive.

Other items in the report say:

> Only two flat wheels were reported for December, 1921, and these were chilled cast iron pony wheels. The record is due to the substitution of steel wheels for chilled cast iron wheels.
>
> The method of car cleaning appears to be proper, and an average of ten cars per car cleaner is deemed a reasonable assignment.
>
> The rules of the company in the matter of heating and ventilation are considered proper.
>
> The location and number of emergency and wrecking trucks are proper and sufficient.
>
> One of the principal requirements of the transportation department is that every employee should be on duty during the period of maximum service demand. This was not complied with at the beginning of the investigation.
>
> Owl service now furnished between the hours of 1 a.m. and 5 a.m. on thirteen lines under order of the commission appears to be adequate. The number of passengers carried now is less than the number carried at the time the order of this commission was made.

The report sets forth that there was a falling off of approximately 28,500,000 in the number of passengers carried in Buffalo last year as compared with 1919. Taking into account the loss of revenue, incident to this decrease, the report points out that the compliance with the suggestions made will result in as efficient service as can be furnished and that such service would reasonably meet the requirements for safety, comfort and convenience of the majority of car riders.

The survey showed that there are 719 cars assigned to the Buffalo city division.

Petitions Fare Continuation

The Springfield (Mo.) Traction Company has applied to the Missouri Public Service Commission for continuation of the present fare rate, 7 cents cash or four tokens for 25 cents and 3 cents for children. This rate went into effect in June, 1920, and was continued in 1921.

Supplements Original Rate Order

California Body Continues Calendar Month Ticket, Reduces Some Commutation Rates, Raises Others

Supplementing its original order, granting an increase of rates on lines of the Pacific Electric Railway, Los Angeles, Cal., the California State Railroad Commission has ordered that the present calendar-month dated tickets based on one round trip daily for each day in the month be continued; that individual commutation tickets dated monthly and good for one round trip daily except Sunday shall be established at rates 10 per cent less than the rates now in effect for the full calendar-month ticket, and that undated sixty-ride, forty-day individual commutation tickets shall be established at the rates approximately 20 per cent higher than those obtaining under the old schedule.

The order was issued following the rehearing of the commission's order of Dec. 24. The rehearing was held in Los Angeles before the commission *en banc* on Jan. 24, 25 and 26. The commission is now awaiting the results of the rehearing of the Hollywood protests against the local fare rise and service, which is set for Feb. 24.

The adoption of undated sixty-ride, forty-day individual commutation tickets will re-establish a form of transportation in effect prior to Jan. 1, 1922, at rates approximately 20 per cent higher than those obtaining under the old schedule. By reason of the adoption of a non-discriminatory mileage basis it is impossible to accomplish an exact 20 per cent increase over the old rates for this form of ticket, but the rates will be as near such amount as the maintenance of the mileage schedule will permit. This form of ticket will show an increase on the mileage basis of approximately 15 per cent over the present calendar-month ticket. The sixty-ride ticket shall be on sale at any time, good for forty days from date of sale, and any number of rides may be used on any one day by the purchaser, the only restriction being that the ticket shall be used by the original purchaser within the forty-day period. It is believed that this form of ticket will provide for the transportation needs of persons who have occasion to ride only five days a week, and for that reason no additional five-day commutation ticket has been established. All of the newly established rates are based on the mileage scales set forth in the order. These new rates were effective Feb. 1, 1922.

The new rates on mileage basis for the re-established sixty-ride, forty-day individual ticket are as follows:

From 1 to 10 miles	1.38 per mile
From 11 to 15 miles	1.242 per mile
From 16 to 20 miles	1.104 per mile
Over 20 miles	1.035 per mile

All fares shall be constructed on actual mileage, except in communities where it is necessary to zone certain terminal points.

In all other respects the original Order No. 9928 remains in effect.

Glendale, South Pasadena and Alhambra city attorneys further entered protests that the through one-way ticket prescribed in the first revised schedule of rates on interurban trains of the Pacific Electric was in excess of the combination of the local fares.

The efforts of these close-in interurban communities were to break down the commission's method of rate adjustment for the Hollywood district. But it was advanced to them by the commission that Hollywood was getting a distinct service known as local trolley service, and these interurban communities were given fast interurban service, which was entirely a separate and distinct service and had no comparison with a local service, even if some of the local service was rendered over the interurban lines serving these suburban towns.

Schedule Changes Planned

Revised service schedules are now being prepared for all lines of the Southern Cambria Railway, Johnstown, Pa. For the present forty-minute schedule to and from South Fork a twenty-four minute service will probably be substituted, and for the eighty-minute service to Ebensburg a seventy-two minute schedule.

Although the franchise which the company has with the borough of Conemaugh calls for a twenty-minute service, the company is confident that by discarding the local cars between Franklin Street and Conemaugh on a twenty-minute schedule in favor of the uniform twenty-four minute service better service can be maintained. The company claims that the majority of residents in Conemaugh favor the more certain twenty-four minute schedule.

New Election on Fares Called

The State Supreme Court of Louisiana has reversed the decision of the lower court and has directed that the city officials of Shreveport shall issue the call for the election on the fare issue there in accordance with law.

The citizens of Shreveport, at an election held on May 18, 1921, ratified an ordinance proposed by the Commission Council of that city granting an increase in fares from 5 to 6 cents by the Shreveport Traction Company. Suit to annul the election was instituted by Huey C. Long, now a member of the Public Service Commission, against the officials of the city, to invalidate the election on the grounds that the call was illegal.

Judge J. L. Land of that city dismissed the suit on the grounds of no cause of action. From this ruling Mr. Long took an appeal to the State Supreme Court. In his bill of exceptions, he assailed the legality of the election granting the increase of fares, claiming the ballots furnished the electors were illegal, and that no provision had been made in the ordinance for the transportation of school children.

Rate Cut Upheld by Court

The Federal Court of Appeals sitting at New Orleans has just decided the case of the Georgia Railway & Power Company, Atlanta, against the Georgia State Railroad Commission. While the decision concerned gas rates specifically, it is none the less important to electric railways as most of the points of law involved concern all public utilities.

The Georgia commission some weeks ago ordered a reduction in gas rates in Atlanta, whereupon the Georgia Railway & Power Company obtained a temporary injunction in the Federal courts restraining the commission from enforcing the lower rates. At the same time the company asked for a higher rate to take care of an alleged loss of $1,000,000 sustained from 1917 to 1920 inclusive. Subsequently the injunction was extended to Jan. 30, 1922, while the Federal Court of Appeals at New Orleans was reviewing the case.

The decision as handed down by the Court of Appeals upholds the Georgia Railroad Commission and denies all of the contentions made by the utility corporation. The decision of the three judges was unanimous.

One of the important points of law involved was the including of federal income taxes in operating expenses. The court denied the Atlanta company this right, and censured it for so including this charge. The power company also was declared to have placed too high a valuation on its properties. It denied the right of the company for a higher rate to take care of its alleged million dollar loss, and also denied it the right of including its franchise value in its property valuation.

According to Preston S. Arkwright, president of the power company, the case will probably be carried to the United States Supreme Court.

In the meantime, due to its order being upheld, the Georgia commission has ordered all gas companies in the State to appear before it March 13 to April 1 and show cause why present rates should not be reduced. It is also said that upon completion of these hearings the commission will take similar action in regard to other public utility rates. The commission is said to hold to the opinion that the period of reconstruction is virtually past and that the burden of proof is upon the utilities of convincing the commission that the emergency rates of war time should be permitted to continue.

Passenger Decrease Serious.—With a passenger decrease of 29,744 in December, 1921, as compared with the same month in 1920, although still 6,000 more than the November total, the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, is considering ways and means by which it may keep up revenues. The city railway commission gave out this information recently, and said that the stabilizing fund of $20,000 set up in March, 1921, is now at less than the $15,000 mark.

Washington Rates Expire Soon

Companies in National Capital Favor Continuation of Present Fare—Merger of Lines Opposed

The Public Utilities Commission of the District of Columbia has taken under advisement arguments heard the past week by the Capital Traction Company, and the Washington Railway & Electric Company as to the fare that shall be charged after the present rate expires on March 1. A zone system, providing for two fares in the suburbs of the city, or continuation of the present fare, which is 8 cents cash or 5 tokens for 35 cents, was advocated by the Washington Railway & Electric Company. The Capital Traction Company advocated continuation of the present fare.

It was stated by President W. F. Ham of the Washington Railway & Electric Company, that for 1921 the company earned 6.17 per cent based on the valuation of the company as fixed by the commission, but 3.42 per cent based upon the company's valuation. Several of the suburban lines of the company, he said, failed to earn operating expenses last year. The company had reduced expenses during the year by $80,000 through the use of cars operated by one man. Of this amount $40,000 was used in remodeling cars to the one-man type. A falling off in travel was anticipated for 1922 due to probable discharge of government employees to reduce government expenses. During and after the snow storm of Jan. 28 the company lost $69,000 because it could not operate cars.

The company contemplates extension of its Eleventh Street and Lincoln Park lines, no extensions having been made since 1918. It is proposed to extend the Eleventh Street line from its present terminus at Eleventh and Monroe Streets, N. W., to Spring Road, thence out Kansas Avenue to connect with the Georgia Avenue line, over head trolley type, at a cost of $107,940. The East Capitol Street Extension in the Lincoln Park section would cost $97,250.

Mr. Ham said he was not opposed to a merger of the two railways, but it was a matter for Congress to decide. He advocated that the investment return allowed to public utilities in the District should be fixed at 8 instead of 6 per cent.

Vice-President and General Manager J. H. Hanna of the Capital Traction Company also advocated an 8 per cent return for the company. The present fare yielded his company 10.26 per cent on the valuation fixed by the commission as against 8 per cent under the company's valuation. Two suburban lines of this company were being operated at a loss. He did not anticipate decreased traffic in 1922. The recent snowstorm cost the company $20,000 in passenger revenue and $10,000 in damages and expenses. This company did not contemplate installing one-man cars as they were difficult to operate in the congested districts.

The Citizens Association Federation advocated a 7-cent cash fare and four tokens for 25 cents. It also suggested that the two companies use the same tracks in some locations.

Astoria Fares Raised from Five to Seven Cents

Effective on Feb. 6, single cash fares on traction lines of the Pacific Power & Light Company, Astoria, Ore., were increased from 5 to 7 cents. This change followed action by the Oregon Public Service Commission in withdrawing its order of suspension issued at the time the tariff originally was filed by the corporation. Under the new tariff tickets in books of fifty may be purchased at the rate of 6 cents each, while so-called school ticket books, good for forty rides, may be purchased for $1.75.

The new tariff was filed about seven months ago, but was suspended by the Public Service Commission pending an investigation. The commission still retains jurisdiction on the case and may order modifications of the tariff if found advisable. In withdrawing its order of suspension the commission said it was evident that continuation of the 5-cent fare would fall far short of meeting actual operating expenses and would inevitably result in discontinuance of trolley service.

Governor Urges 5-Cent Fare Bill in New Jersey

Governor Edwards in a special message submitted to the New Jersey Legislature Feb. 7, called for the passage of a bill introduced by Senator Alexanter Simpson of Hudson County, Democratic minority leader, providing for a return to the 5-cent trolley fare in those cities which prior to the war had 5-cent franchise contracts with traction companies, later upset by the courts. The Governor said:

> We are rapidly returning to conditions approximating those before the war, and it will be only a short time before the 5-cent fare will be extremely profitable again. I therefore urge upon the Legislature the duty to add to the Public Utility Statute the legislative declaration that this statute shall not be construed to authorize the fixing of any fare in excess of 5 cents for trolley transportation.

The Governor said that when there had been a public demand for 3-cent fares, the traction companies pointed to the franchises as compelling them to furnish transportation at 5 cents even though the rate should be unprofitable. They claimed the advantages of profitable fare, the Governor said, on the ground that they would have to stand the loss of possible unprofitable years, but when the unprofitable years came along these contracts were repudiated by the companies.

Referring to the Simpson bill the Governor said in his message that the bill if passed would help to relieve the State from the condition of virtual paralysis of the Public Utility Commission in the matter of fixing trolley rates.

Albany Case Nearing Close

All evidence has been taken in the hearing of the petition of the United Traction Company, Albany, N. Y., for an 8-cent fare on its lines. Cross-examination of witness has been ended also. The attorneys have two weeks in which to file briefs with the Public Service Commission.

At the last hearing, on Feb. 6, Corporation Counsel Guy, of Troy, suggested that the fare matter be taken out of the hands of the Public Service Commission. This suggestion received no support. He said that since the company was insolvent, not even a 10-cent fare would enable it to give adequate service. The attorney for the company stated that an 8-cent fare would put the company on a paying basis.

Sacramento Keeps Five-Cent Fare

The 5-cent fare will continue in Sacramento, Cal., on the lines of the Pacific Gas & Electric Company. The company had filed a tariff providing for that rate, and the California State Railroad Commission granted the continuation.

One-man cars also will go into operation in Sacramento, the commission having ruled last December that a 5-cent fare could continue only if this type of car was installed and operated.

Had former conditions remained, according to the commission, a 7-cent fare must be allowed the company. Accordingly, the city repealed an ordinance passed last fall prohibiting the use of one-man cars.

Transportation News Notes

Reading Experiments with Seven-Cent Fare.—A 7-cent cash fare has replaced the 8-cent city fare and 9-cent rural fare on the lines of the Reading Transit & Light Company, Reading, Pa. No reduction will be made in strip tickets. The 7-cent fare will be tried for six months, after which the Public Service Commission will decide upon a permanent rate. In the meantime the company will report monthly its receipts and the number of passengers carried.

Commission Approves Brunswick Change.—The Georgia State Railroad Commission has approved the deal whereby the Brunswick & Interurban Railway takes over the property and lines of the Suburban Street Railway. The line was almost scrapped due to the court action against the company, and was taken over to prevent this by a group of young business men of the city who formed the present company. About $35,000 in new capital has been paid in and the new company is continuing operation of the lines. The action of the young men's club has been referred to in previous issues of the ELECTRIC RAILWAY JOURNAL.

Personal Mention

G. W. Wattles Leaves Omaha

Prominent Traction Leader Retires From Omaha & Council Bluffs Company—Goes to California

Gurdon W. Wattles, who retired in January after a long and active service with the Omaha & Council Bluffs Street Railway, Omaha, Neb., may be referred to as "One of the master builders of Omaha and the West." In fact this deserved tribute was accorded to him at a recent farewell banquet given by 150 of Omaha's leading business men.

He distinguished himself as a traction executive over a period of nearly twenty-five years, during which time Omaha passed from the status of a thriving Western community to its present metropolitan importance. His business acumen carried him into other fields of endeavor, but he will be remembered first for his development of the properties of the street railway system.

At the annual meeting of the board of directors Mr. Wattles resigned as chairman of the board. He has established his future home near Los Angeles, Cal.

THIRTY YEARS A FORCE IN OMAHA

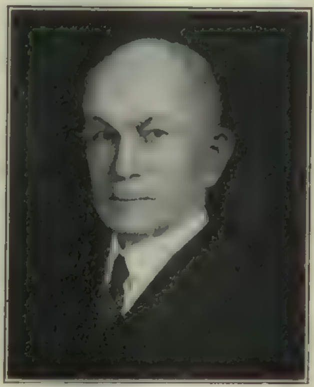
Mr. Wattles came to Omaha thirty years ago from Carroll, Iowa, and entered the Union National Bank. He was vice-president and later president. During 1898 he became interested in the organization then known as the Omaha Street Railway, and was elected to the board of directors in 1900. He soon became vice-president of the company and was active in the consolidation of the Omaha Street Railway and the Omaha & Council Bluffs Railway & Bridge Company, the consolidated properties being incorporated as the Omaha & Council Bluffs Street Railway. This present company operates all the electric railway lines in Omaha and its neighboring city, Council Bluffs, Ia., across the Missouri River.

Mr. Wattles became president of the Omaha & Council Bluffs Street Railway in 1905, serving in that capacity continuously for fifteen years. His resignation from active management was followed by his election as chairman of the board of directors.

At the time of the consolidation, nearly twenty years ago, Mr. Wattles faced the problem of building up the dilapidated lines and equipment in Omaha and Council Bluffs. Business depression of years was reflected in the condition of the system. Under his administration, after the consolidation, a street railway system probably second to none in the country was built up. New rails of a heavier type were laid and out-of-date cars were replaced by cars of a modern and uniform type. More than $10,000,000 was spent on the property after the consolidation and under the administration of Mr. Wattles.

In his extensive program was the establishment of shops for repairing and building cars. The company has built practically all of its equipment during the last ten years. A large and modern power house was built on the riverfront and six commodious carhouses were constructed. The tracks on all lines have been rebuilt and placed on concrete or crushed stone base and heavy rails have been used for reconstruction.

"To deserve the good opinion of the patrons of the company by rendering a service above criticism," has been Mr. Wattles' motto.



GURDON W. WATTLES

"I think it truthfully can be said that the Omaha & Council Bluffs Street Railway is as near a popular public service corporation as can be found anywhere in this country," Mr. Wattles stated before leaving for California. "The equipment and service are of a high class, that bring commendation from all who compare them intelligently with other cities."

The particular ability of Mr. Wattles has been shown in his first class organization of the forces under him. He chose as subordinates the very best men that could be found to work out the technical operations of the railway property, and this has been the secret of his success in private and public work.

Mr. Wattles was the chief figure in the promotion of the Transmississippi Exposition, which was held in Omaha in 1898. This great enterprise was launched during a period when real courage and faith were required to carry it to completion. Mr. Wattles personally obtained the official co-operation of the government of this country, of Canada and of the Pan-American countries. He succeeded in those efforts, just as he succeeded in everything else he undertook. He also led the business interests of Omaha to a successful conclusion in the establishment of the Omaha Grain Exchange and Omaha today is an important terminal grain market. He was the central figure in Omaha's realization of its first great hotel—the Fontenelle—an imposing structure of which any metropolis might be proud. In fact his influence has been felt in every important movement in Omaha and in that part of the West.

Mr. Hungerford Shows Up Trolley Troubles

"Your Trolley Cars" is the title of an article in the Jan. 21 issue of *Collier's* which brings to the general reader a spirited presentation of the problems confronting traction companies. Edward Hungerford, the author, who specializes in handling transportation subjects and has contributed to the ELECTRIC RAILWAY JOURNAL, writes history entertainingly and reviews in the article the work of Edwin M. Walker, general manager of the Terre Haute, Indianapolis & Eastern Traction Company, who, like Edward Bellamy, "looking backward," found that service was the missing element in the present as compared to the past. By providing what was needed, he increased the number of passengers in spite of increased automobile competition.

From his wide and intimate acquaintance with the industry Mr. Hungerford recalls what John L. Livers did for the Charlottesville & Albemarle Electric Railway to make it a going concern. Painting the cars orange and blue, with true university patriotism, was not the least of his changes. Mr. Hungerford describes the successful adoption of the weekly pass in Youngstown and other methods of selling transportation. This salesmanship Mr. Hungerford considers the solution to the difficulties of railway companies.

P. T. Robinson has been appointed division engineer of the East Bay Electric Division of the Southern Pacific Company. Mr. Robinson was formerly assistant division engineer of the Western Division. He was succeeded in that post by J. P. Edwards of Ogden, Utah.

Joseph F. Bradner, Sr., formerly connected with the engineering and power department of the New Orleans Railway & Light Company as constructor and architect, and more recently associated with the building division of the city engineer's office, has been appointed secretary of a local realty company.

W. O. Clure has resigned as general passenger agent for the Twin City Lines, Minneapolis, effective Feb. 15. He will become associated with the Chicago office of Barron G. Collier, Inc., New York, N. Y. Mr. Clure succeeded A. W. Warnock with the Twin City Lines on Feb. 5, 1920. Previously he had assisted in publicity work for the company for about a year.

Charles D. Jones, president of the Cincinnati Gas & Electric Company and secretary and treasurer of the Miami Railway, Dayton, Ohio, has succeeded his father, Major Frank J. Jones, as one of the directors of the Cincinnati (Ohio) Street Railway. Major Jones desired to retire. Samuel Assur, who has been second vice-president of the company, was also elected a member of the board of directors.

Obituary

George W. Jackson, formerly engineer of Mayor Thompson's traction commission, Chicago, Ill., and senior member of the George W. Jackson & Fitzpatrick Company, contractors, died on Feb. 5. Mr. Jackson had frequently been retained in connection with traction matters. Recently he contended before the Illinois Commerce Commission that a return to the 5-cent fare on Chicago Surface Lines was possible by virtue of economies and rerouting, he suggested. He favored a subway system and submitted proposals for the construction of one. In the contracting field Mr. Jackson's most important accomplishment was the construction of Chicago's 60 miles of freight tunnels in the downtown section of the city.

George L. Radcliffe, general manager of the Cleveland (Ohio) Railway, died on Feb. 9. He has held this position since 1912. Mr. Radcliffe had an active railway career, beginning as conductor on the old Broadway and Newburg line in Cleveland when J. J. Stanley, now president of the company, was the superintendent. He was advanced from conductor to cashier and paymaster, and later became superintendent. He was for some time associated with the Detroit (Mich.) United Railway and also with the Schenectady (N. Y.) Railway. In 1910 he returned to the Cleveland Railway as superintendent of the consolidated lines of the city. In 1912 he was appointed general manager of the company.

Thomas A. Delaney, superintendent of transportation of the New York (N. Y.) Railways, died Jan. 3. Mr. Delaney was associated with the New York Railways for thirty-six years, and since 1912 has held the position of transportation superintendent. His earliest association in the electric railway field was formed in 1886 when he became timekeeper for the Broadway & Seventh Avenue Railroad, New York City. He also worked in the general office of this company, but after the Metropolitan Street Railway was organized he transferred and for some time had charge of operation of various lines which that company leased. In 1900 he was appointed supervisor of transportation of the company. In 1912 he was appointed superintendent of transportation of the reorganized New York Railways Company.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Firm of Spooner & Merrill Organized

Charles W. Spooner, consulting engineer, Grand Rapids, Mich., has announced the organization of the firm of Spooner & Merrill, consulting engineers, with offices in Grand Rapids. The firm has secured the services of Charles A. Hamilton, formerly with the Fargo Engineering Co., Jackson, Mich., as specialist in mechanical engineering, and of Donald M. Cook, who will continue in charge of valuations and appraisals. Both Mr. Spooner and his new partner are natives of Grand Rapids, both have degrees in civil engineering from the University of Michigan.

Mr. Spooner has had a broad experience in civil engineering and valuation work and as an expert in engineering litigation.

Mr. Merrill received his degree in 1902 and was then employed for some time in the office of the United States Engineer, and subsequently in the office of the City Engineer in Grand Rapids. He was actively associated with the harbor work in a number of Michigan cities. For thirteen years thereafter, he was engaged in the engineering of the New York State barge canal. Subsequently he became principal assistant to Joseph Ripley who is known for his service as chief engineer of the Grand Canal Improvement Board for the Chinese Government and in connection with the canal work at the Soo, Panama and in New York.

Westinghouse Electric Makes Changes in Personnel

Announcement of changes and transfers in personnel of the Westinghouse Electric & Manufacturing Company has been made by officials of that company. Several changes have recently been made in the railway sales department, the organization of which is:

F. H. Shepard, director of heavy traction; M. B. Lambert, manager; E. D. Lynch, office manager; F. F. Rohrer, assistant to manager in charge of contracts; C. H. Long, section manager railway equipment contracts and orders; R. Seybold, manager price section; T. H. Stoffel, electric railway freight haulage export; W. R. Stinemetz, manager, and R. W. Carter, assistant manager of the heavy traction division; K. A. Simmon, manager light traction division; J. L. Crouse, manager, and J. W. Lewis, assistant manager railway development and supply division.

H. A. Campe has been appointed manager of the small motor appliance section of the industrial department, succeeding V. M. Beeler, who has been transferred to the Springfield office.

G. L. Washington has been appointed assistant to manager of the Havana, Cuba, office of the Westinghouse Electric International Company.

South African Railway Electrification

Cable advices announce that the contract for electrification of 170 miles of single track of the South African Railway between Pietermaritzburg and Glencoe has been given to the Metropolitan Vickers Electric Company, of Manchester England. The cost of this work will be about £750,000, being based on a revision of the British bids as of Jan. 1. No new bids were asked for, since the old ones were reduced in amount on account of wage cuts.

Electrical Exports Amounted to $95,814,885

Electrical exports for December, according to the Electrical Division of the Department of Commerce of the United States, amounted to $5,177,276, making the total preliminary figure for 1921 $95,814,885. Exports for 1920 exceeded those of the year just passed by approximately $6,000,000 only. Comparing by classes of goods exported the two years 1920 and 1921 certain gains were shown. Transformers showed a gain of more that $3,000,000, from $4,803,158 for 1920 to $7,988,440 for the twelve months of 1921.

Peking Tramways Planning Improvements

Extensions involving 15 miles of track and the construction of a 1,500-kw. electric generating plant are being planned by the Minister of Communications at Peking, who is chairman of the board of directors of the Peking tramways. According to Commercial Attaché Arnold, bids for material, equipment, trucks will be opened on March 20. The cars will be built in China.

Metal, Coal and Material Prices

Metals—New York	Feb. 7, 1922
Copper, electrolytic, cents per lb.	13.125
Copper wire base, cents per lb.	14.125
Lead, cents per lb.	4.70
Zinc, cents per lb.	4.80
Tin Straits, cents per lb.	31.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.72
Somerset mine run, Boston, net tons	1.87
Pittsburgh, mine run, Pittsburgh, net tons	2.15
Franklin, Ill., screenings, Chicago, net tons	2.00
Central, Ill., screenings, Chicago, net tons	1.75
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, New York, cents per lb.	6.25
Weatherproof wire base, N. Y., cents per lb.	16.50
Cement, Chicago consumers net prices, without bags	1.97
Linseed oil,(5-bbl. lots), N. Y., cents per gal.	79.00
White lead, (100-lb. keg), N. Y., cents per lb.	12.25
Turpentine (bbl. lots), N.Y., cents per gal.	92.00

Rolling Stock

The Macon Railway & Light Company, Macon, Ga., has placed thirteen standard safety cars in service. These were made by the J. G. Brill Company.

The Santa Barbara & Suburban Railway, Santa Barbara, Cal., has placed in service eleven standard safety cars, purchased from the American Car Company.

The Central California Traction Company, San Francisco, Cal., reports that it has built the body for one 40-ft. electric locomotive in its shops. This locomotive is of semi-steel construction and will be used in interurban service.

The Georgia Railway & Power Company, Atlanta, Ga., has placed six prepayment passenger cars in city service. These cars are 44 ft. 6 in. long and have a seating capacity of forty-eight. They were built by the Cincinnati Car Company.

The Waterbury & Milldale Tramway Company, Waterbury, Conn., reports that it has placed two war-board cars, manufactured by the J. G. Brill Company, in service. These cars are of semi-steel construction and seat fifty-six passengers.

The Connecticut Company, New Haven, Conn., reports the purchase of three semi-steel cars either for one-man or two-man operation. These cars are 43 ft. over all and have a seating capacity of fifty-two. They were built by the Wasson Manufacturing Company.

The Municipal Railways of San Francisco, through the City Engineer, M. M. O'Shaughnessy, is authorized by the supervisors to prepare specifications for twenty center-entrance street cars. Specifications are nearing completion and bids will be asked in immediate future.

Track and Roadway

Kitchener, Ont.—The ratepayers have passed the by-law authorizing the raising of $63,000 for electric railway extensions.

Jacksonville (Fla.) Traction Company is completing an extension on the Brentwood line, which loops around and into the Florida State Fair grounds.

Winnipeg (Man.) Electric Railway will be requested by the Municipal Council of St. Vital to construct an electric line on St. Anne's Road to Lavalee School.

North Shore Connecting Railroad, Evanston, Ill. has made application to the Illinois Commerce Commission for permission to construct an electric railway through certain parts of Evanston and Wilmette.

Cincinnati (Ohio) Traction Company has been directed by Street Railway Commissioner Kuertz to begin repairs on the Fairview Heights inclined plane so it can be used safely for single-track cars. Engineers who made the report advise automatic bumpers at both landings and reinforcing the "track stringers" with heavy timbers.

Interstate Public Service Company, Indianapolis, Ind., is constructing a high-tension transmission system from Reddington, 6 miles north of Seymour, and about half way between Jeffersonville and Indianapolis, to North Vernon It will connect with the high-tension line from Jeffersonville and Louisville to Indianapolis. Another line is being erected from Mineral Springs to Elizabethtown, which will supply energy for farm and homes. The North Vernon Company will purchase power from the Interstate company.

Power Houses, Shops and Buildings

New York, (N. Y.) Transit Commission will finish construction of the Jerome Avenue Yard with the $72,000 appropriated by the Board of Estimate. The board refused to allow the commission any funds for purchasing anti-creepers, or to paint the columns of the White Plains section of the Interborough Rapid Transit lines.

Terre Haute, Indianapolis & Eastern Traction Company Indianapolis, Ind., will consider an enlargement of the West Tenth Street power plant, which furnishes power to the Indianapolis Street Railway, or the building of a new power plant in the Vigo County or adjacent coal field, it became known recently. The enlargement would cost approximately $3,000,000, it is said.

Waukesha, Wis.—A new power line connecting the West Allis substation of the Milwaukee Electric Railway & Light Company with the new substation of the Waukesha Gas & Electric Company on Barstow Street will be ready for use some time in March. The Milwaukee company built the new circuit from West Allis to the east city limits of Waukesha and the Waukesha company constructed a tower line from there to Barstow Street station.

Professional Notes

The Associated Engineers, Inc., Milwaukee, Wis., is a firm recently incorporated by F. W. Ullius, Jr., William E. Skinner and Ralph M. Kibbe to engage in consulting engineering. Mr. Ullius is president of the firm and Mr. Skinner, who was formerly with the electrical department of the Chicago, North Shore & Milwaukee Railroad, is vice-president.

The Chillingworth Engineering Corporation, New York, N. Y., announces that it has associated with it Frank H. Plum, Herbert Pluemer, George E. Mellin, and Harold von Thaden, all formerly of the C. W. Hunt Engineering Corporation, and will carry on a business similar to that conducted by the C. W. Hunt Engineering Corporation. It will occupy offices at 143 Liberty Street.

Trade Notes

Westinghouse Electric & Manufacturing Company East Pittsburgh, Pa., announces that T. H. Hays has been appointed manager of the Indianapolis office of the company.

Automatic Reclosing Circuit Breaker Company, Sixth and Wesley Avenues, Columbus, Ohio, has recently placed on the market a new automatic starter for direct-current motors of 10 hp. capacity or less.

Hancock Manufacturing Company, manufacturer of portable oil burners, torches, furnaces, etc., has moved its Philadelphia office to 1726 Sansom Street, Bell telephone, Spruce 5626. Herbert Vogelsang, who has been connected with the company for six years, will be in charge.

The Ajax Metal Company, Philadelphia, Pa., has appointed H. L. Carpenter, Jr., formerly in charge of the Pittsburgh office and later connected with its main office in Philadelphia, as traveling representative in western Pennsylvania. Mr. Carpenter has been with the Ajax Metal Company for more than twenty years.

Bridgeport Brass Company, Bridgeport, Conn., has announced the appointment of W. D. Blatz as general sales manager. This appointment was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28. During his six years connection with the company, he has made a thorough study of the brass industry in its various branches. Before joining the Bridgeport Brass Company he had had twelve years' experience in the banking and brokerage business.

New Advertising Literature

Holophane Glass Company, 342 Madison Avenue, New York, has issued bulletin No. 343, describing the Holophane lightmeter, which is an accurate portable instrument designed for the measurement of footcandles, lamberts, etc.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued Circular 1094-B, describing turbine generator units. This publication contains a discussion of the reactance and impulse types of turbines, both the semi-double flow type and the multiple-cylinder type. Bleeder turbines and geared turbines are described. The generator is also discussed in detail, and illustrations are given to show the latest types of construction.

Accessories for Complete Conduit System.—The Sprague Electric Works of the General Electric Company, New York, N. Y., has issued two booklets describing Sprague materials for a complete conduit system. One of these is devoted to GreenfielDuct and the other to what is commercially known at Spragueletts, which include various types of conduit boxes and covers, together with fittings for complete wiring.

Peacock Proves

Maintenance Costs Are Lower

Perhaps you didn't know it—but it is actually cheaper to buy and install new Peacock Brakes than to keep on repairing old, worn out, makeshift ones. The following experience of a well-known company is typical.

Why We Got This Order For PEACOCK BRAKES

Faced with the necessity of ordering a large stock of parts for the repair and replacement of old hand brake equipment, a certain large company consulted us about the matter, although the old brakes *were not ours*! They were astonished to learn that the cost of a whole new equipment of Peacock Brakes would be so small, and they soon convinced themselves that the saving in future maintenance costs would soon save the entire difference between the first cost of new Peacock Brakes, and the estimated cost of repairing the old ones.

Then they ordered 650 *complete equipments*!

They came out even inside of two years. And not a cent was charged to new capital—the new installation was paid for out of the maintenance allowance for the old brakes. As a matter of fact these Peacock Brakes have now been in use for over five years without expense for repairs.

Peacock Brakes are made right and are made well. They cut the cost of maintenance almost to zero, and they carry with them also, the assurance of safety and reliability, as the hand brakes which combine the maximum power, speed and capacity.

National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

Bankers and Engineers

Ford, Bacon & Davis
Incorporated

Business Established 1894
PHILADELPHIA NEW YORK SAN FRANCISCO
DETAILED EXAMINATIONS BY EXPERTS
Reports for Financing covering Valuation, Turnover, Costs, Reserves, Rates.
UTILITIES INDUSTRIALS SHIPPING

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS VALUATIONS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
NEW YORK BOSTON CHICAGO

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ELECTRICAL—CIVIL—MECHANICAL
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ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

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Consultant
FARES, BUSES, MOTOR TRUCKS
More revenue from *more* riders
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Investigations, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Power Plants

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THE J. G. WHITE ENGINEERING CORPORATION
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52 VANDERBILT AVE., NEW YORK

ENGELHARDT W. HOLST
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Appraisals, Reports, Rates, Service Investigation, Studies on Financial and Physical Rehabilitation Reorganization, Operation, Management
683 Atlantic Ave., Boston, Mass.

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CONSULTING ENGINEER
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NEW YORK
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PHILADELPHIA

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WM. BARCLAY PARSONS H. M. BRINCKERHOFF
EUGENE KLAPP W. J. DOUGLAS
Engineers—Constructors—Managers
Hydro-electric Railway Light and Industrial Plants
Appraisals and Reports
CLEVELAND
743 Hanna Bldg.
NEW YORK
84 Pine St.

DAY & ZIMMERMANN, INC.
ENGINEERS
Design, Construction
Reports, Valuations, Management
NEW YORK PHILADELPHIA CHICAGO

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

Bates One-Piece Steel Poles with Ornamental Lighting

This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units.

The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

The series lighting conductor is run from pole top to pole top eliminating the use of expensive, troublesome underground cable.

The use of Bates Permanent Steel Poles with ornamental lights represents maximum economy and the utmost in art.

Bates Expanded Steel Truss Co.

208 South La Salle Street
CHICAGO, ILLINOIS

Byllesby
Engineering & Management
Corporation
208 S. La Salle Street, Chicago
New York Tacoma

SANGSTER & MATTHEWS
Consulting Accountants
Valuation and Rate Specialists
Depreciation Consolidations Rate Schedules
Reports to Bankers
25 Broadway, NEW YORK
134 South LaSalle Street, CHICAGO

ENGEL & HEVENOR
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Steam and Electric Railroads
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220 BROADWAY, NEW YORK

PETER WITT
UTILITY CONSULTANT
456 Leader-News Bldg., Cleveland, O.

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Tool Steel Gears and Pinions
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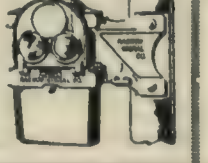
Flaxlinum Insulation
Anglo-American Varnishes, Paints, Enamels, Surfacers, Shop Cleaner
Johnson Fare Boxes
Perry Side Bearings
Drew Line Material and Railway Specialties
Hartman Centering Center Plates
Economy Power Saving Meters
H & W Electric Heaters
Garland Ventilators
Pitt Sanders
National Safety Car Equipment Co.'s One-Man Safety Cars
Central Equipment Company's Hand Holds

SPOONER & MERRILL
Consulting Engineers
Valuations; Reports; Design Power Plants, Waterways, Flood Relief; Counsel Engineering Litigation.
Powers Theatre Building, Grand Rapids, Mich.

AUTOMATIC SIGNALS
Highway Crossing Bells
Headway Recorders
NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KY.



Mutti

The above picture shows one of the misapplications of mutti, or cement, as it is used in Persia.

It illustrates a very common method of executing robbers and murderers.

The victim is well drugged first and is then stood on his head in a large cylindrical container, after which the liquid cement is poured in and allowed to harden.

Automatically thus he becomes his own monument and for many years afterwards marks the spot where he committed his crime ,a constant reminder and warning to others who are criminally inclined.

He becomes what one might call a concrete example.

This, to our mind (as we have said) illustrates the misapplication of a constructive element—just like the operator who thinks that carbon brushes are just carbon brushes and that any type will work anywhere. *Wrong!*

If you are having brush trouble, just ask about the *Morganite Way.*

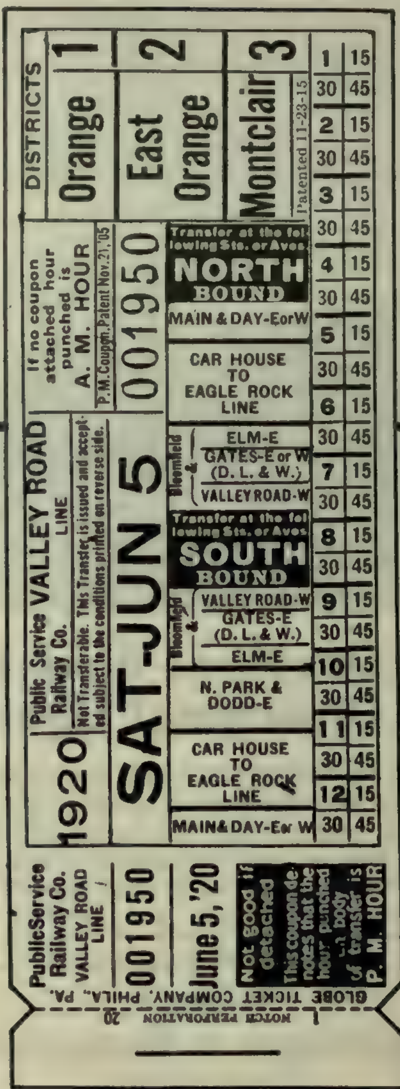
Morganite Brush Co., Inc.

Main Office and Factory:
519 West 38th Street, New York

DISTRICT ENGINEERS AND AGENTS:

Electric Power Equipment Corp., 13th and Wood Sts., Philadelphia.
Electrical Engineering & Mfg. Co., 909 Penn Ave., Pittsburgh.
R. W. Lillie Corporation, 176 Federal St., Boston, Mass.
W. R. Hendey Co., Hoge Bldg., Seattle.

Herzog Electric & Engineering Co., 150 Steuart St., San Francisco.
Special Service Sales Company, 502 Delta Bldg., Los Angeles.
Railway & Power Engineering Corporation, Ltd., 131 Eastern Ave., Toronto, Ontario, Canada.



DISTRICTS
1 Orange
2 East Orange
3 Montclair
Patented 11-23-15

If no coupon attached hour punched is A. M. HOUR
P. M. Coupon, Patent Nov. 21, '05
001950

Transfer at the following Sts. or Aves.
NORTH BOUND
MAIN & DAY-E or W
CAR HOUSE TO EAGLE ROCK LINE
Bloomfield & ELM-E
GATES-E or W (D. L. & W.)
VALLEY ROAD-W

Transfer at the following Sts. or Aves.
SOUTH BOUND
Bloomfield & VALLEY ROAD-W
GATES-E (D. L. & W.)
ELM-E
N. PARK & DODD-E
CAR HOUSE TO EAGLE ROCK LINE
MAIN & DAY-E or W

1920
Public Service Railway Co. VALLEY ROAD LINE
Not Transferable. This Transfer is issued and accepted subject to the conditions printed on reverse side.
SAT-JUN 5

1	15
30	45
2	15
30	45
3	15
30	45
4	15
30	45
5	15
30	45
6	15
30	45
7	15
30	45
8	15
30	45
9	15
30	45
10	15
30	45
11	15
30	45
12	15
30	45

Public Service Railway Co. VALLEY ROAD LINE
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June 5, '20
Not good if detached
This coupon denotes that the hour punched in body of transfer is P. M. HOUR

GLOBE TICKET COMPANY, PHILA., PA.
20 NOTCH PERFORATION 1

GLOBE
P.M. Coupon Transfers

Study the make-up of this transfer. Consider the possibilities of the P. M. Coupon method of ending that round-tripping abuse. Note the conspicuously printed day and date. Figure how much time can be saved in issuing such transfers, and the accuracy secured in accepting them for legitimate rides.

Doesn't it appeal to you as a means of securing greater efficiency on your road? It is doing it for the Public Service Railway Co. of New Jersey and many other systems large and small.

Globe Tickets

Reduced Fare Tickets, School Tickets, Weekly and Monthly Commutation Card Tickets, Passes, in fact all forms in strips, pads or books. Let us help design the tickets and transfers best suited to your conditions.

Globe Ticket Company
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Griffin Wheel
Company
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GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

All of our plants have adequate facilities for fitting wheels to axles

FOUNDRIES:

Chicago
Detroit
Denver
Boston
Kansas City
Council Bluffs
St. Paul
Los Angeles
Tacoma

A New Fiscal Year

For most of the street railways, January marks the beginning of a new year, financial as well as calendar. For the last few weeks of 1921 everyone was busy squeezing down expenses to the last red copper, to help swell the cash balance for the year's balance sheet.

The start of a new year does not give any license to start on a campaign of reckless expenditure, but it does mean the time has come to stock up on repair parts which are low. The hand-to-mouth policy is a dangerous one. Some accident may leave you with crippled cars in the shop waiting for parts, when they are badly needed on the road.

We have ample supply parts to make prompt delivery on your orders, large or small. Inquiries solicited.

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"

Hollowspun Concrete Poles at Homestead, Pa., on lines of Pittsburgh Rys. Co.

HOLLOWSPUN

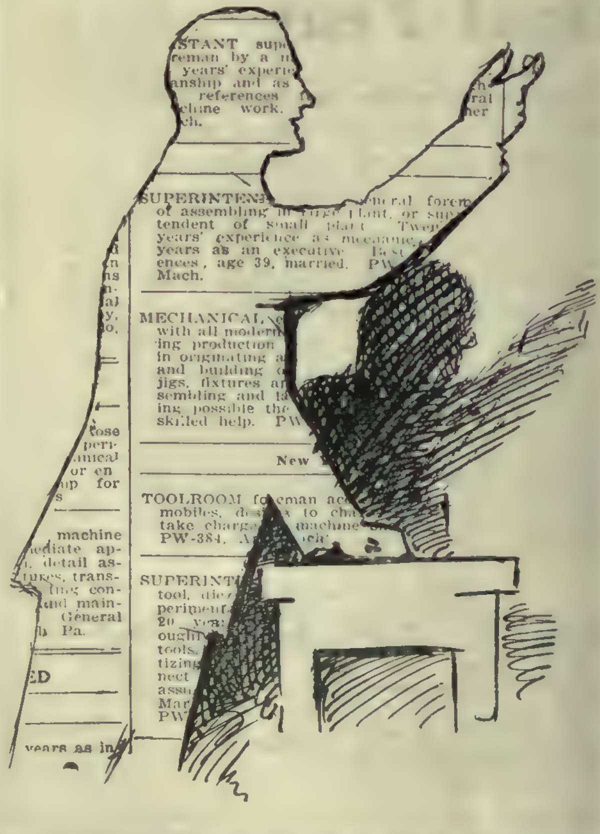
Concrete Trolley Poles

are being recognized by progressive railway companies as economical for new work and replacement on account of their permanence, freedom from maintenance expense, attractive appearance and low first cost.

Massey Concrete Products Corp.

Peoples Gas Bldg., Chicago

Sales Offices: New York Pittsburgh Atlanta St. Louis Dallas Los Angeles



"SEARCHLIGHT" Want ads Talk—

They go direct to those in the industry you wish to reach and tell your story in a forceful and business-like way.

They don't mince words but get right to the point.

Use them for—

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- Employment Agencies
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- Franchises
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- Industrial Sites
- Labor Bureaus
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- New Industries Wanted
- Partners Wanted
- Patent Attorneys
- Patents For Sale
- Plants For Sale
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For Every Business Want
"Think SEARCHLIGHT *First"*

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STANDARD

WIRES AND CABLES

include bare and insulated conductors of all kinds for all classes of service, also cable accessories.

Catalogues on request.

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New York Pittsburgh Detroit San Francisco
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AMERICAN ELECTRICAL WORKS AMELECTRIC Wires and Cables PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

Galvanized Iron and Steel Wire and Strand

Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

The Circuit Breaker with Brains

Makes Feeder Control Automatic

LET'S GET ACQUAINTED

THE AUTOMATIC RECLOSING CIRCUIT BREAKER COMPANY

COLUMBUS, OHIO

DISTRICT SALES OFFICES:

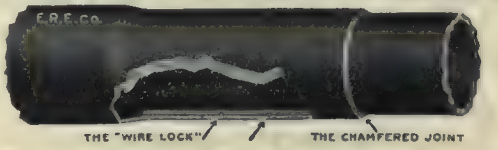
Pittsburgh, 223 Oliver Bldg.
Philadelphia, 1613 Chestnut St.
Charleston, W. Va., 110 Hale St.
Birmingham, 510-512 Brown-Marx Bldg.
St. Louis, 401 National Bank of Commerce Bldg.

ANACONDA

Copper Wire

111 W. Washington St., Chicago

ELRECO TUBULAR POLES



COMBINE

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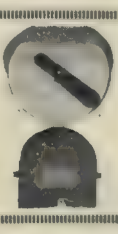

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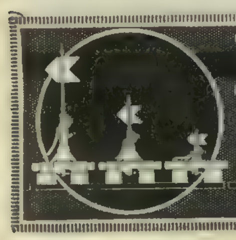

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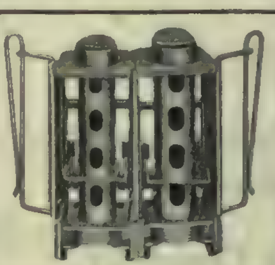

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Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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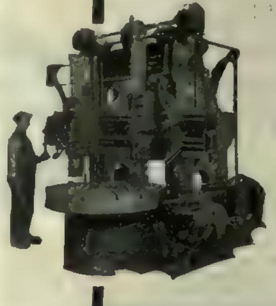

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FOREMAN, experienced in overhauling and maintenance of rolling stock motors, etc. Handle men to advantage. Best references. PW-391, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

PRACTICAL master mechanic, 22 years' experience. Up to date in reconstruction of equipment. Can handle men and get results. Experience in one man cars and overhead line work. Best reference. PW-388, Elec. Ry. Journal.

SUPERINTENDENT of transportation, with a fine record of 17 years on large city and interurban properties, desires a change. Capable of taking over details of transportation of any property and operating same in an economical manner. Capable of getting best of results from employees. High grade references from leading men in railway field. Address stating full details. PW-392, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

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A1 Units Immediate Delivery

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2—1,250 kw. Westinghouse Condensing or Non-Condensing Turbines (actual capacity 1,500-1,800 kw.), 60 cyc., 3 ph., 480, 2,300 or 11,000 volts, 1,200 r.p.m. Complete with Le Blanc condensers.

2—600 kw. Westinghouse Non-Condensing Turbo Units, 60 cyc., 2 or 3 phase, 220-480 or 2,400 volts. Units newly rewound and rebladed.

1—500 kw. Westinghouse Condensing Turbo Unit, 60 cyc., 2 or 3 phase, 2,200 volt, 3,600 r.p.m. Complete with surface condenser.

1—1,000 kw. General Electric-Curtis VERTICAL Condensing Turbo Unit, 60 cyc., 3 ph., 2,300 volt, 1,200 r.p.m. Complete with jet condenser.

1—1,500 kw. General Electric VERTICAL Condensing Turbo (actual capacity 2,200 kw.), 60 cyc., 3 ph., 2,300 v., 900 r.p.m. Complete with surface condenser, piping and all auxiliaries.

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1—10,000 kw. General Electric VERTICAL CONDENSING Turbo Unit, 25 *cycle*, 3 phase, 6,600 volt. Complete with surface condenser and all auxiliaries.

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1—1,500 kw. Westinghouse Engine Type Generator, 220-250 volt, direct connected to horizontal heavy duty cross compound Corliss engine.

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1—800 kw. Same as above.

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3—350 hp. Stirling B. & W. Water Tube Boilers. 200-lb. allowance. Without grates or stokers.

4—500 hp. B. & W. Steel Header Water Tube Boilers. 12 tubes wide, 21 tubes high. 200-lb. allowance. Complete with stokers and all fittings.

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Notice to Advertisers

Owing to the holiday—Washington's Birthday, Wednesday, February 22nd—the *"Searchlight"* pages of the February 25th issue of the *Electric Railway Journal* will close for press a day earlier than usual.

CHANGES OF COPY

and new advertisements for the February 25th issue should reach us on or before.

**10 A.M. TUESDAY
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Railway Motors

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1—300 kw. Westinghouse, 3 phase, 60 cycle, 370 volts A.C.; 575 volts D.C.; 600 r.p.m.

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2—1000 kw. General Electric Synchronous Motor Generator Sets, each consisting of 1—1000 kw., 600-volt type MPC, 514 r.p.m., D.C. generator, and 1—1400 kva., 3 phase, 60 cycle, 2300/4000 volt, 514 r.p.m. synch. motor.

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1—850 kw. Gen. Elec. 575-volt Compound Wound 100 r.p.m. Generator, direct connected to 23 and 54 x 48 Greene Wheelock cross compound heavy duty 4-valve engine, complete with surface condensing equipment and panel; price, f.o.b. cars, $7,500.

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Telephone 4337-4338 Rector

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Air Compressors
Ingersoll-Rand Co.

Air Motors
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Air Receivers
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Ohio Brass Co.
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Carnegie Steel Co.
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Ohio Brass Co.
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Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co

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Amer. Brake Shoe & Fdry. Co.
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Columbia M. W. & M. I. Co.
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Silver Lake Co.

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Crossings, Track (See Track, Special Work)

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Drills, Track
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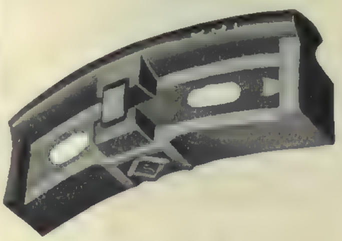

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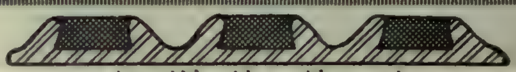

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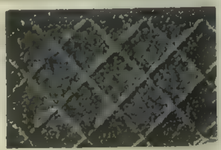

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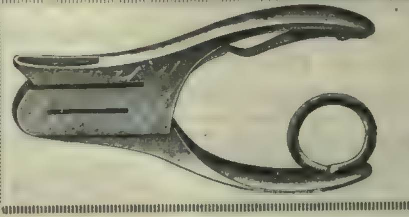

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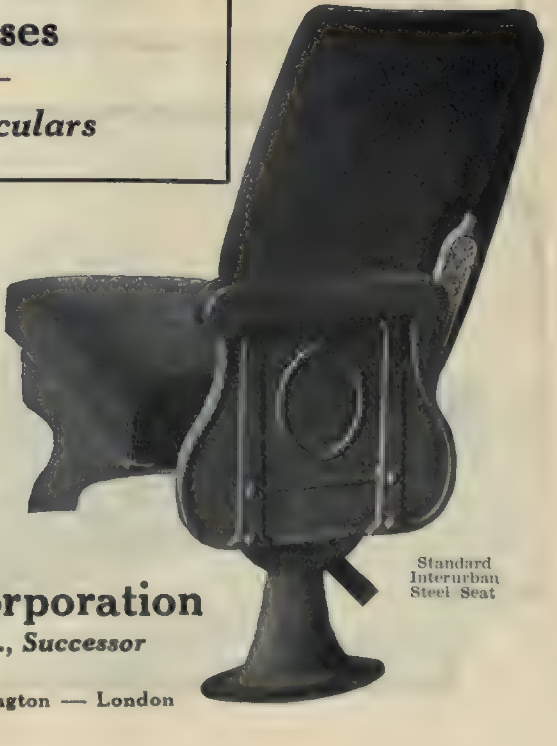

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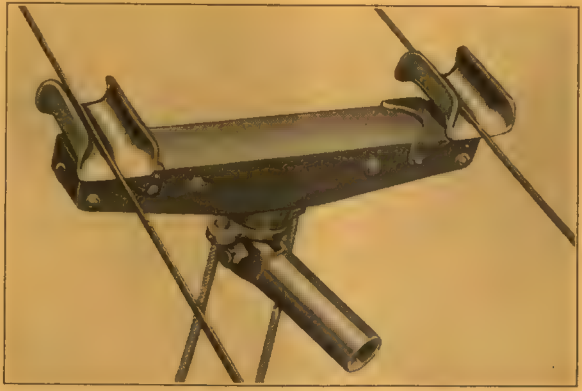

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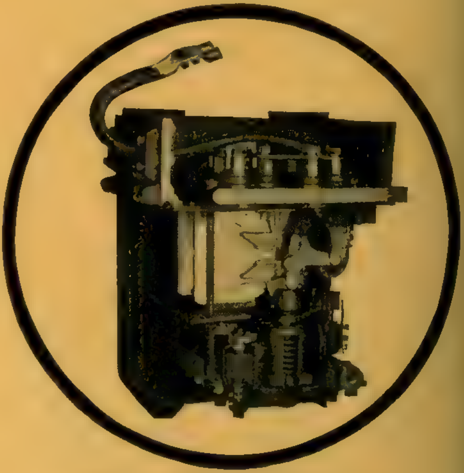
With its recent installation on the new cars for the Frankfort Elevated in Philadelphia, it is now in use on every elevated and subway system in America.



Type 480 Unit Switch

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION 1922

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Vol. 59, No. 7 New York, February 18, 1922 *Pages* 261-304

Electric Railway Journal

Henry W. Blake and **Harold V. Bozell**, Editors **Henry H. Norris**, Managing Editor

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Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879. Printed in U. S. A.

Deciding What Shall Be Used

DIFFERENCES of opinion arise almost every week among the editors of the "Electric Railway Journal" as to what articles shall be used in the current issue. They are the same differences of opinion that present themselves in every newspaper office. About some articles there can be no question as to whether they shall be used this week or next, but this is true with only a small part of the material except in the case of a special issue devoted to a particular topic.

It is a difficult and trying job this one of deciding what shall go in and what stay out of any issue. Timeliness is one of the outstanding and controlling factors in making the decision. Thus, more than sixteen pages were given over in a recent issue to an account of the proceedings of the meeting of the Central Electric Railway Association. This may to some have seemed a disproportionate amount of the total of forty-four pages contained in that issue, but all of the subjects were ones that had been discussed by electric railway men in convention and represented the best thought of the leaders in the industry on the questions in hand. Surely there could hardly be a better cue as to what are the problems that concern railway men than the topics which their elected spokesmen in association activities select for them to discuss.

As for strictly news material there are many items each week which claim a place at once in the current issue because they are news. Others, while still important as news, lack the feature that presses them forward for immediate publication. Thus in one week recently there came to hand annual reports of three railways all peculiarly in the public eye. Summaries of all of the reports could have been published in one issue, but only at possible sacrifice of essentials through condensation. So while the significance of the reports as news with a claim to immediate publication was realized, the consideration of timeliness was sacrificed so as to permit more complete treatment by the publication of the reports in different issues a week apart.

Never an "Electric Railway Journal" comes out that the editors do not go over the contents carefully to see how the completed whole measures up to the ideals which they seek to set. These post mortems are useful in that they teach what to avoid in the future. As a writer in the New York *Evening Post* said recently, there is one example of a paper which publishes just about everything anybody wants in it. That is the *Congressional Record*. The moral is obvious.

Circulation of this Issue, 6,125 **Advertising Index—Alphabetical, 52; Classified, 48, 50; Searchlight Section, 47**

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The Long-Life Frog

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ELECTRIC

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East Pittsburgh, Pa.

Type CR Trolley Frog after 290,000 wheels had passed through it.

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AERA
1922

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(AUTOMATIC)

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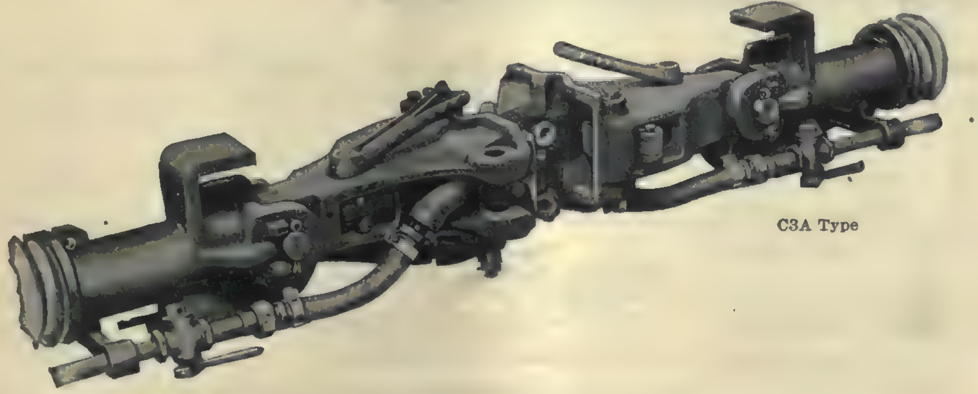

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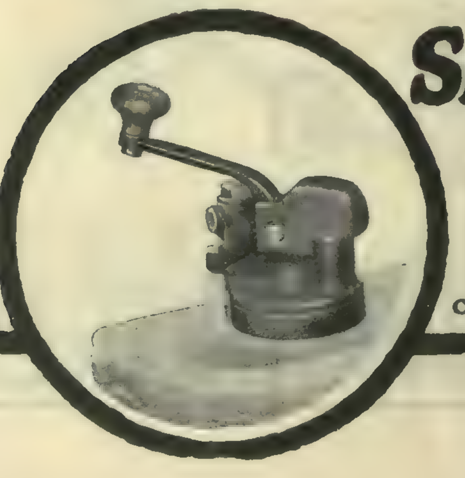

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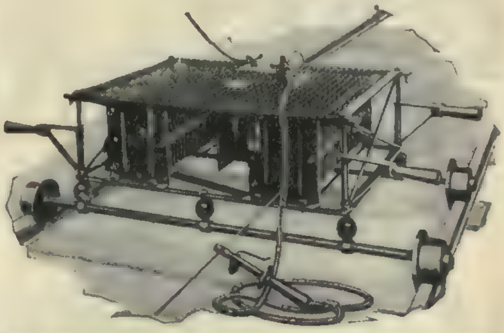

O-B Resistance Welder—A simple rugged machine with an automatic safety control which protects the operator and speeds the work.

O-B Type AW3 Arc Weld Bond. Installed with any electric arc welding machine. Best results are obtained when O-B Resistance Arc Welder or Wilson Plastic Arc Welder are used.

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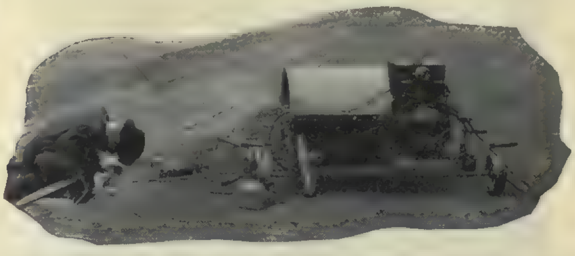

Wilson Plastic Arc Welder is a dynamotor in which has been included all that is best in the art and in portable form.

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Installed cost of O-B Welded Bonds—both gas and arc—is low. Yet the contact—or rather union—with the rail is positive and it is enduring.

O-B Welded Bonds were the first in the field—and they have kept first place. Every element of the design contributes to ease of installation or service durability or both.

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Besides several types of Arc Weld and Gas Weld Bonds, the O-B Family includes a full line of stud terminal bonds.

***Look through pages** 446 **to** 508 **of Catalog No.** 18*

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Bridgeport Brass Company

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Write today for price and all details

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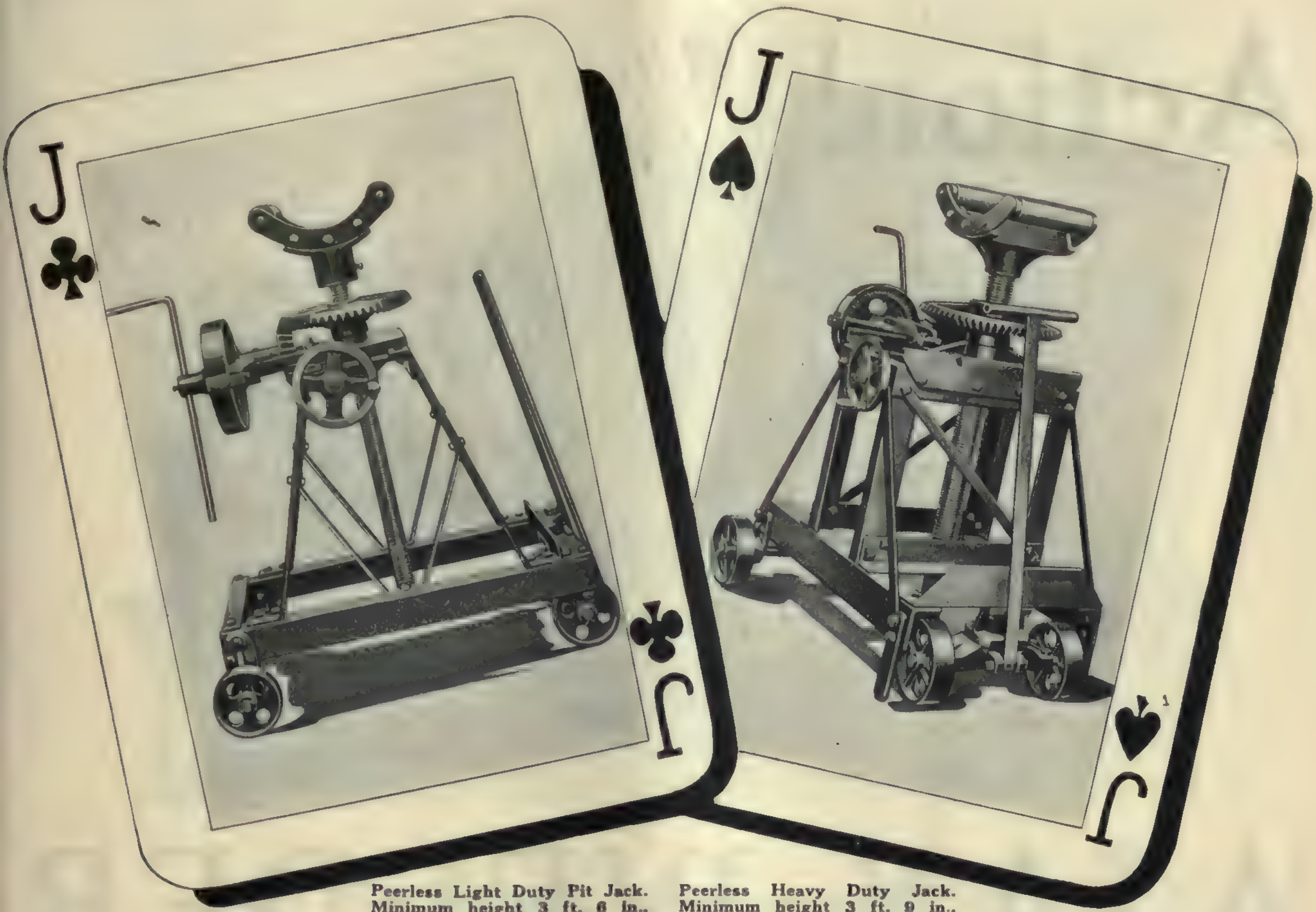

Peerless Light Duty Pit Jack. Minimum height 3 ft. 6 in., maximum height 5 ft. 4 in.

Peerless Heavy Duty Jack. Minimum height 3 ft. 9 in., maximum height 6 ft. 3 in.

A Pair of Jacks

that's good for a stiff raise

They're Peerless

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Either jack is operated by a handle so arranged that two speeds are provided —a low speed ratio for lifting heavy loads and a high speed ratio for lighter work or for lowering.

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Don't let the patron rage. Save his time and get his coin.

National Pneumatic "Rushour" appliances will help your conductors and motormen do it.

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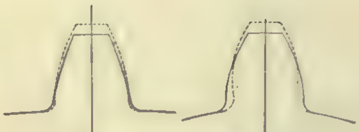

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The combining of service with safety accounts for the growing popularity of the safety car the economics of which are well known. The majority of these safety cars are G-E equipped, for dependable electrical apparatus is a prerequisite of service and safety.

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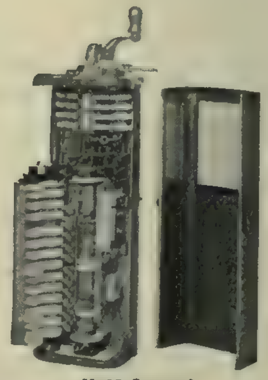
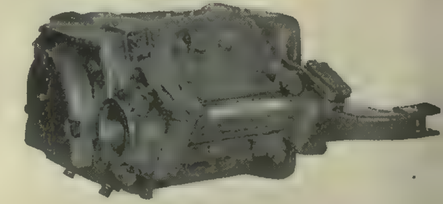


K-63 Control



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In the Electric Railway Industry, but Not of It

WITHIN the next few days the committee on company and associate membership of the American Association, under the chairmanship of Frank R. Coates, will launch an aggressive campaign to bring the outsiders into the fold. The committee will appeal to the self-interest of those whom it seeks to enlist and can make a strong case along this line. But the strongest argument that can be put up is that the industry needs every available member in its association if it is to accomplish the work that ought to be done.

After all, the best work of this association; as of any other worth-while organization, is not done for its own members, but for the cause which it represents, as a whole. And each railway and each manufacturer in the railway field is getting a great deal of benefit from the association's activities even if only in the "prospect" class. Once the management of a company is convinced of this fact an application for membership will follow as a matter of course.

The way in which membership in the American Association is appreciated by those who have enjoyed its privileges was illustrated by the philosophical way in which assent was given to the considerable increase in dues a couple of years ago. Those who were inside wanted to stay there and were willing to pay for the opportunity to do so. It would seem that every corporation or individual eligible for membership would want to get in, even if for no other reason than that it is the proper thing to do.

Overheating Increases Maintenance Costs of Railway Motors

AT THE midwinter convention of the American Institute of Electrical Engineers, just closing in New York City as this issue of the ELECTRIC RAILWAY JOURNAL goes to press, a paper on railway motor heating was read by G. E. Luke of the Westinghouse Electric & Manufacturing Company. The paper is abstracted elsewhere in this issue, but from a rather different standpoint from that which the author had in preparing it. The paper was prepared to explain and illustrate an original method for predicting the service performance of a motor on the basis of a continuous load test. It is abstracted here to emphasize the importance of considering the characteristics of the insulation if maintenance costs are to be kept down.

This is the time of year when motors come into the shop in large numbers for repair. The extra duty thrown upon them due to snow and ice raises temperatures to the breakdown point, and out they go. Some of this annual epidemic of armature and field failures is unavoidable and must be taken as incident to the business, but much could be avoided by the exercise of greater care in preventing overloading of the motors.

The modern electric railway motor is so reliable that it is difficult to realize how sensitive is the insulation to very high temperature. And, as Mr. Luke points out, it is not the average temperature which is the criterion of safety or danger, but the "hot spots." This is particularly true of the ventilated motors, which have high continuous capacity but comparatively low thermal capacity. Unlike the old-time heavy motors, they must get rid of the heat that is generated about as fast as it is produced. The situation was clearly explained by J. M. Hipple in the issue of this paper for Jan. 21, 1922, page 107. The "old timers" could absorb a lot of heat in their copper and iron and could distribute this heat readily from one part to another within their insides, so capacious from the thermal standpoint. The newer motors are superior in every practical point, but they must be treated with proper consideration. This consideration will follow as a natural result from a careful study of the ways in which temperatures rise in the different parts of a motor and of the effects of high temperatures upon its vulnerable parts.

Getting More Work Out of the Tools in the Shop

THE principal means for keeping down electric railway maintenance costs is through intelligent use of labor-saving machinery. This axiomatic statement receives ready mental assent, but as to applying the principle, "there's the rub." There has been a tremendous development in machine tools of all kinds during the past five years. This fact is appreciated mainly in the manufacturing industries, where the advances took place most rapidly under the stress of wartime production. The utilities are now heir to all of this development, if they will but take advantage of their opportunity.

Electric railway shop, track, line and power departments already show some quickening influences due to the improvement in mechanical devices. Machinery is to a limited extent making the work of all departments more interesting as well as more efficient. In time the effect will be seen in reduced cost, but of course the rate of increase in the cost of labor for a time outstripped the improvement due to the tardy adoption of more and better machines.

The present time is one of transition from the era of hand craftsmanship to that of the machine, and level heads are needed to insure the adaptation of modern methods to familiar processes. Machines already at work, and not yet slated for retirement, must be made to work harder, and new tools must be secured to displace obsolete ones or to perform operations not performed by machines before.

Take the case of the maintenance shop, for example, and the machine shop in particular, for here it is that machines rule almost supreme. In spite of the great interest of superintendents of equipment and of master mechanics in machine operations the average electric railway machine shop does not contain many examples of up-to-date machine tools, and some tools now installed are not working as they might. The machine lathe, good, useful tool that it is, is still doing many things that ought to be done on special tools. Turret lathes, milling machines, boring mills, radial drills, etc., are not much in evidence in most cases. And the layout of the existing equipment would sometimes bear revision. It was refreshing to note, in a shop recently visited, that a fine turret lathe was being uncrated. From the looks of the machine it was evident that it will "eat up the work" when it gets a chance. In the same shop crates were being taken off a couple of up-to-date drill presses also. In another shop a new radial drill had just been set up, for the present to be used as a boring mill on motor-shell reboring. This job will require several months, after which another one just as good will be ready for the machine. But these cases are exceptional; the era of machine shop rehabilitation is but dawning.

Care Should Be Exercised in the Selection of Welding Electrodes

THE general adoption of arc welders for repair work both in the shop and on the track undoubtedly has permitted many savings in maintenance costs. But the adoption of correct welding practices has not always followed the introduction of the welders. Too often there has been a failure upon the part of those in authority to see that once a welding apparatus is purchased, it is properly used. The proper use resolves itself into careful selection and training of operators together with the selection of varying grades of welding steel or electrodes, suitable to each particular job.

It does not follow that a welding rod which works well in repairing an armature shaft will be suitable for the welding of a rail joint. Meanwhile many kinds of welding rods are being offered and are said to be suitable for welding almost anything. It should go without saying that any old kind of fence wire, cut up into rods, should not be purchased for welding purposes. On the other hand it will pay to be very careful in the selection of this welding material, which properly should be purchased on an analysis basis where each kind of rod may then be secured for the distinct kind of welding to be performed.

One set of experiments now under way has demonstrated very clearly that there is a very definite relation, for example, between the amount of carbon in the rail steel, that in the splice bars and that in the welding rod itself to the amount of carbon in the resultant seam metal. It has been shown that in the case of two joints with the same rail but with splice bars of different carbon content if the same welding rod is used in both cases the resultant seam weld will not be the same. The same thing is true when the same rail and the same splice bars are employed in both joints but with different welding rods. Hence as there cannot be two best methods for any particular case it follows that each case requires special consideration.

The recommendations of the manufacturers of welding equipment, with their facilities for determining the needs of each specific combination, should be closely followed, and if they are expected to give the best service, electric railway engineers using their processes should see that the manufacturers are kept informed of the results being obtained in the field. This applies also to special experiments that the railways may be making. The purpose of such co-operation is to permit the prompt correction of wrong practices.

The American Bureau of Welding has recently issued certain long-needed and valuable specifications for welding wire or electrodes which should be in the hands of all who are using either arc welders or acetylene welders for any purpose. These will permit checking of rod qualities, which is especially desirable with rods purchased in the open market as compared with those backed by the recommendations of the makers of welding equipment.

The electric welding art is dependent upon two main factors: good operators and proper materials. While a good operator may sometimes make a good weld with poor material, it is not fair either to the operator or to the art to expect the best results if the best of materials are not supplied. It will pay track and shop engineers to give the closest attention to both of these factors if the expected and beneficial results are fully to be obtained from the use of welding apparatus. Operators must be properly trained and materials must be selected with due regard to the kind of work to be done.

New York Transit Plans from an Engineering Point of View

THOSE who wish an outline of the general engineering principles of the New York transit plan will find it clearly expressed in the paper read by Mr. Turner at the meeting last Wednesday of the New York Section of the A. S. C. E. It is indeed a daring conception, although most of its individual features have been tried out and found successful by experience elsewhere. Briefly, it comprises service at cost for all bus, street railway and rapid transit lines within the city with a barometer fund, public ownership of the roads and private operation of them, three operating companies controlled by one central organization in whose board of trustees both city and private owners are represented, a flat fare and universal transfers, at least so far as each of the three operating companies are concerned, and finally, according to Governor Miller, at least, at first a 5-cent fare. This will be made possible, presumably, by the savings expected through city co-operation and traffic reforms.

Undoubtedly, many transportation men will express some disappointment that at a time of such radical changes no effort is being made to introduce some form of distance fare, even if it was confined to such a crude form as a charge for transfers on the surface lines. But it is true that political tradition and popular sentiment in New York are strongly opposed to anything but a flat fare and to a greater extent probably than in most other American cities. Should the present plan not work well, a distance fare can be introduced later perhaps as easily as now. In this connection Mr. Sprague brought out clearly that a flat fare with universal transfer system means greater congestion of the car lines than would otherwise be the case because passengers will ride for short distances which otherwise they would cover by walking.

Altogether New York seems destined to be the place where a most interesting test will be made in the near future of united action in improving transit conditions by a carefully thought-out co-ordinated system, co-ordinating all means of transit under public and private direction. Such action has turned out well in Boston, though on a somewhat different plan of organization. It is to be hoped that an equally satisfactory result will be obtained in New York.

Attacks on Commissions a Growing Menace

LEW SHANK, Mayor of Indianapolis, addressed a mob from the steps of the State House in Indianapolis, Ind., a few days ago. The subject of his address was an attack upon the Public Service Commission. As an isolated example of a political diatribe his remarks about the commission would properly merit no greater notice than any other grand stand play to the populace. But they are not an isolated example. Similar attacks upon commission rule are reported from New Jersey by Governor Edwards and from California by Governor Stephens.

In the case of Governor Edwards that executive, in he special message to the Legislature, asked the repeal f the commission legislation and a return to home rule nd a 5-cent fare. Although Governor Stephens said nothing derogatory of the California commission or of he method of commission regulation, he did seek to nterfere in recent rate cases by pleading directly with he commission to reconsider the evidence on which the ommission based its rulings. Whether or not Mr. Stephens had his political ear to the ground, the suggestion which he made to the effect that the public was expecting rate deflation was, to say the least, needless meddling in the affairs of a body set up by the State in a quasi-judicial capacity to do justice to all he interests involved. As indicated before, the case of Mayor Shank as an isolated example might properly e dismissed for the grand stand play that it was, but here is grave danger ahead in the manifestations of meddling in the cases of Governors Edwards and tephens, even though the appeals of these executives all upon deaf ears.

Commissions are not infallible. Commission rule is ot always all that it should be. But the commission lan of regulation is the best that has so far been conceived for settling the vexed problems of administering the affairs of the corporations in the interest of the public. These public regulatory bodies, as pointed out in the ELECTRIC RAILWAY JOURNAL of Feb. 11, are natural development, just as were the courts of equity. the work of the commissions or the functioning of them is to be governed by the political whim of the our, then return to the Dark Ages is in prospect in far as the utilities are concerned. The present commissions with their broad powers over construction, accounting, financing, rates and service were, as is ell known, created because of the total or partial failure of the older forms of regulation. But apparently some are forgetting this fact; and as *Public Utilities Reports* for Jan. 5 indicates, the need now exists for gilance in preserving the good results that have redounded to the public and the utilities through the agencies for regulation which have been built up. The editorial "What Produced the Commissions" in that paper is an able statement of the case in favor of the commission form of regulation and the ELECTRIC RAILWAY JOURNAL finds itself in full accord with the ideas erein expressed that the present need is for strengthening rule by commission by assisting in preserving e present general high standing of such commissions.

It may be that *Public Utilities Reports* is correct in its conclusion that the attacks so far made on the commissions have left those bodies stronger than ever, but ere is need constantly to be on guard lest interference such as that of Governor Stephens and the plausible plea such as that by Governor Edwards shall work to the detriment of public regulation by increasing distrust even if it does nothing more. As Arthur W. Brady, president of the Union Traction Company of Indiana, felt called upon to explain in a recent speech at Muncie, Ind., commissions when judged from the public standpoint have three objects and three only: (a) To insure reasonable and just rates by the utilities; (b) to require the furnishing of reasonably adequate service and facilities by the utilities; (c) to prevent unjust and unreasonable discrimination by the utilities. When these objects are attained the public needs are satisfied and the public rights protected. The inherent right rests with the utility, of course, to demand that regulation shall not deprive it of the opportunity to earn a reasonable return on the fair value of its property. This is a right not even referred to in the acts creating the commissions. It is conferred by state and federal constitutions.

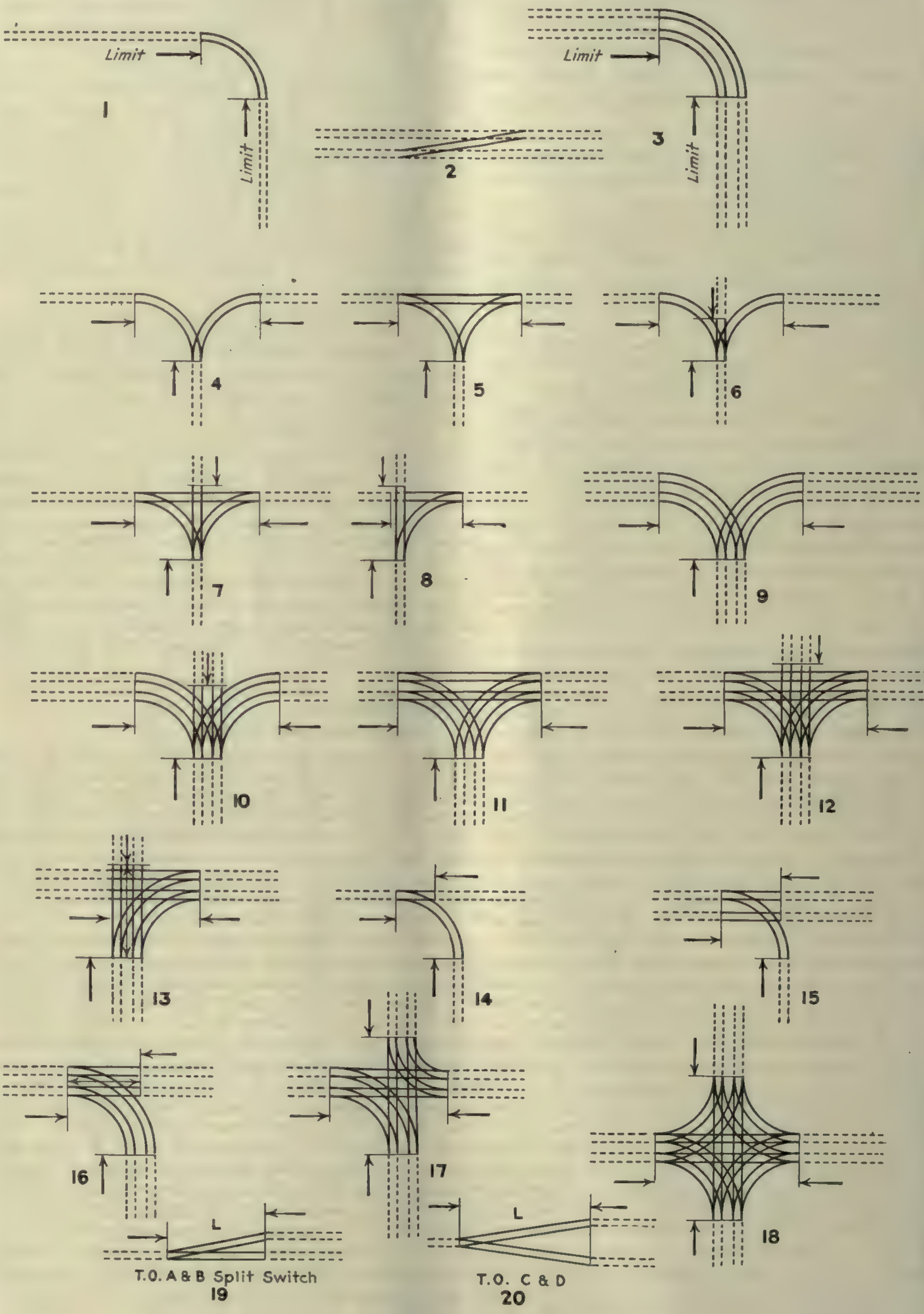
It was the attempt to exercise this right by appeal to the courts by the Public Service Railway in New Jersey from a commission decision that prompted the special message of Governor Edwards to the Legislature. The mere observance and protection of this right is not, however, enough to meet public or corporate needs. As Mr. Brady has recently pointed out and as others have indicated before, capital cannot be procured and improvements carried out unless the utility is accorded such treatment with respect to rates and practices that it may compete for capital in the money market on an equality with other business subject to like risks. In the last analysis the public can take out of a utility only what it has previously put into it. The measure of its support of the utility is the measure of service which the public may expect. A utility can no more live with impunity beyond its means than can an individual.

Selling Tickets to Banks for Ready Cash

THERE never has been, nor can there ever be, a set rule as to the commercial value of selling single-ride tickets at cut rates. The conditions may not be such as to lead to a decided stimulus to riding; or the increase in riding may be offset by the combination of lower income per ride and greater difficulty in checking the conductor's returns. However, there is one advantage about the ticket that does not seem to be exploited to any extent, namely, to secure cash in advance.

When tickets are sold through conductors and stores, they are issued on a credit basis, so that the railway gets its money no faster than from cash fares except for bigger sales on pay days. In fact, it has a lot of extra accounting to worry about. A rather different procedure was adopted by a company which, having retained a basic 5-cent fare, cannot sell tickets for convenience reasons but only on a bargain basis. It happened to need some thousands of dollars cash right off the reel. To borrow short-term money at high rates was most distasteful. The manager, however, had a happy thought. He visited the local banks and asked them if they would be willing to favor him to this extent: Pay in advance for several thousand dollars worth of tickets and then offer them for sale to the usually thrifty people that patronize banks. He would, of course, see that their names were liberally advertised on the ticket-selling car placards. The offer was accepted—a high compliment to the belief in the permanence of the electric railway in question!

Various Types of Special Trackwork Layouts Used in Unit Method of Valuation



A Method of Valuation of Railway Special Trackwork

Unit Costs of Various Special Trackwork Types Are Set Up—Method Particularly Applicable to "Yard-Stick" Valuations of Electric Railway Properties*

BY JOSEPH E. RAPUANO
Maintenance of Way Department, the Connecticut Company,
New Haven, Conn.

PRESENT-DAY demands upon public utilities, calling for frequent and quick valuations for rate purposes, have created the necessity of resolving a complete valuation into its component parts, so that, by treatment independent of one another, more help can be utilized and consequent expedition obtained. This article deals with the methods employed by the Connecticut Company in arriving at a fair reproduction value of its special trackwork. It is felt that there are many points of interest in this special trackwork valuation inasmuch as it was carried out independently of the rest of the valuation, and thus necessitated thorough co-operation on the part of all concerned.

The item of proper segregation as between special and non-special trackwork was carefully considered, and limits were established, to assure consistent treatment of all types of special trackwork layouts. Prices used were those of 1910-1915 inclusive, as adopted by the Public Utilities Commission in its appraisal of the system. Wherever actual costs as of 1910-1915 were available for any layout, they were used; elsewhere average unit prices prevailed as determined from "The Massachusetts Public Service Commission's Valuation Report of Street Railway Properties in Massachusetts, June, 1916," and from data furnished by the local maintenance of way department. In arriving at the results obtained, both the shortness of time available for the work and the cost of a more minute inventory were considered; and the procedure here outlined was adopted as the one most likely to comply with the desired requirements. The fair values thus obtained, although not strictly representative for each special layout, are nevertheless quite representative of the fair reproduction value of all the special trackwork as a whole, the value generally regarded in rate fixing.

A preliminary investigation of office records showed a Track Statement giving in great detail the character of the track construction with distances between special trackwork layouts. A special index map book also showed special trackwork locations by means of serial numbers referring to individual detailed plans of each special trackwork layout, from which plans all necessary data were taken for pricing purposes.

The next question was how best to proceed with the valuation so as to co-operate with those working on the tangent track values. Since the latter were using distances shown on the Track Statement, and since these distances carried through special curves, both single and double track, crossovers and crossings, but skipped all other special trackwork layouts, it was deemed necessary so to valuate special curves, crossovers and crossings that the values obtained would only show the additive cost of the work over that of ordinary tangent track, single or double, as the case might be. This precaution obviously prevented the same piece of track being valued, first, as ordinary tangent track, and then again as special trackwork. All other special trackwork layouts were valuated completely, inasmuch as they could not be mistaken for tangent track and so valuated. Forms for the valuation of each type of layout were accordingly prepared and are shown in Table I, *a*, *b*, *c*, *d*.

TABLE I—FORMS FOR VALUATION OF VARIOUS TYPES OF LAYOUTS

a = Form for specials and turnouts. Item and Details	Reproduction Value	Notes
Rail	$4,395.44	Loc. No. 60, New Haven Division
Ties (290 at 65 cents)	188.50	Double track connected branch-off with crossings
Ballast (3½-in. gravel) 41 cu. yds. at 60 cents	24.60	7-in., 95-lb. T. and 7-in., 110-lb. G.
Track laying (20 per cent of $4,395.44)	879.09	3 cast welds at $21 = $63.00
		4 sws. at $165 = 660.00
Grading (189 cu. yd. at $1.75)	330.75	4 mates at $115 = 460.00
Pavement { 395 sq. yd. wood block at $3.20		27 frogs at $100 = 2,700.00
Pavement { 15 sq. yd. brick at 2.60	1,303.03	68-ft. of S.T. at $1.13 = 76.84
		198-ft. of S.T. at $2.20 = 435.60
Total cost of layout	7,121.41	$4,395.44

b = Form for crossovers. Item and Details	Reproduction Value	Notes
Total cost of crossover	$796.00	Loc. No. 53. Waterbury Division
Cost of rail displaced (57 ft. of S.T. at $1.13)	64.41	Crossover rail = 7-in., 95-lb. T. and 7-in., 110-lb. G.
Net excess cost of crossover	731.59	Main line rail displaced = 7-in., 95-lb. T.
Cost of excess ties (10 at 65 cents)	6 50	
Cost of excess track laying (10 per cent of $731.59)	73.16	
Total excess cost of crossover	811.25	

c = Form for curves. Item and Details	Reproduction Value	Notes
Total cost of special curves	$1,210.40	Loc. 30½. Norwalk Division
Cost of same length of ordinary rail (512 ft. at $1.13)	578.56	512 ft. of single track 7-in., 95-lb. T and 7-in., 110-lb. G.
Excess cost of special curves	631.84	Main line rail displaced = 7-in., 95-lb. T.
Excess cost of track laying (512 ft. at 15 cents)	76.80	512 ft. at $2.20 = $1,126.40.
Total excess cost of special curves	708.64	4 cast welds at $21 = $84.00.

d = Form for crossings. Item and Details	Reproduction Value	Notes
Total cost of crossing	$1,077.12	Loc. No. 19. Bridgeport Division
Cost of displaced length of ordinary rail (24 ft. at $1.13)	27.12	Double track trolley across single steam.
Excess cost of crossing rail	1,050.00	Crossing rail = 7-in., 110-lb. G.
Excess cost of track laying (24 ft. at $1)	24.00	Main line rail = 7-in., 95-lb. T.
Total excess cost of crossing	1,074.00	24 ft. of 7-in., 95-lb. T. displaced = Trolley portion.

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*In the ELECTRIC RAILWAY JOURNAL issues of May 21 (page 947) and May 28 (page 985) the general method of valuation of the Connecticut Company's property was outlined in some detail. Mention was there made of the separate valuation of special trackwork. The present article by Mr. Rapuano gives the details of the special trackwork valuation.—EDITORS.

The various types of layouts encountered are shown on page 264, as are also their corresponding limits for valuation. In turnouts, the limits are the switch joint and a point where the tracks reach full centers. In single track branch-offs, the limits are the switch joint and end of the frog-arm on the main line, and the end of the special rail of the branch-off itself. In all other layouts, the limits are obtained by using the extreme ends of the special trackwork on one track, generally the switch joint and end of frog arm, and squaring off from these points onto the other track. This treatment causes some ordinary tangent track rail to be included, which, of course, must be given unit price for that kind of rail.

Realizing that the cost of any layout is the sum of the costs of its component parts, tables were prepared showing average costs of switches, mates, frogs and special rail. These tables covered all types of rail but were not lengthy, due to the fact that where there was very little difference between the costs of two or more types of rail the same unit price was used for the group. Consequently shorter tables resulted with no loss in the efficiency of the results obtained. In setting up these unit values, due consideration was given to the type of construction, as to whether it was "ironbound hard center," "bolted insert work," or "built-up." In adopting these average unit prices, all switches were assumed 12 ft. long, except split-switches, which were taken as 15 ft. in length. Spring frogs, and built-up frogs, used with split-switches, were assumed 15 ft. long; all other frogs 8 ft. long.

A table was prepared showing the cost per foot of single track for each type of ordinary tangent track rail, and this table, together with the one mentioned above for special rail, gave the necessary data for curves, crossovers and crossings.

Wooden ties were figured as 6 in. x 8 in. x 8 ft. at 65 cents each, while shell steel and twin concreted steel ties were taken at $2.50 and $4 each, respectively.

Track laying was figured both as a percentage of the total rail cost and as a price per foot of track. The percentage basis was arrived at after a careful consideration of the actual costs at various special trackwork layouts.

Ballast was either gravel or stone, or a combination of Telford and stone, or Telford and gravel. Values

TABLE II—TABULATION OF GRADING IN CUBIC YARDS FOR DIFFERENT RAIL HEIGHTS

Amount of Grading in Cu. Yds. — A = Surface Area in Sq. Yds.

Rail Height	3½-in. Ballast	6-in. Ballast	6-in. Concrete Sub-Foundation + 6-in. Ballast —Hartford Div.	11-in. Telford Base
6 in.	0.43 A	0.50 A	0.67 A	0.64 A
7 in.	0.46 A	0.53 A	0.69 A	0.67 A
etc.	etc.	etc.	etc.	etc.

TABLE IV—NUMBER OF TIES AND AREA OF EXCAVATION FOR DIFFERENT TYPES AND LENGTHS OF TURNOUTS

Type and Length of Turnout	Number of Ties	Surface Area in Sq. Yds.
A—67 ft.	64	105
B—93 ft.	86	148
C—51 ft.	56	74
D—67 ft.	72	106
No. 6 Frog—110 ft.	96	173
No. 7 Frog—124 ft.	108	195
etc.	etc.	etc.

TABLE III—PRICES PER SQUARE YARD OF THE VARIOU TYPES OF PAVEMENT

Symbol	Description of Pavement	Cost Per Sq. Y
P	Asphalt on 6-in. concrete	$2.14
P_1	Topeka on stone	1.00
P_2	Bicomac on hassam	1.75
P_3	Asphalt on hassam	2.50
Y	Plank	2.34
Y_1	Wood block on 6-in. concrete	3.20
Y_2	Wood block on plank	4.30
Y_3	½-in. asphalt on 6-in. concrete	2.55
R	Granite block on 6-in. concrete	3.42
R_1	Granite block on earth	2.25
R_2	Cobbles on earth	0.60
S	Macadam	0.70
S_1	Bituminous macadam	1.10
T	Brick on 6-in. concrete	2.69
T_1	Brick on plank	1.86
T_2	Brick on 5-in. concrete	2.55
T_3	Brick on stone	1.86
T_4	Brick on gravel	1.86
V	Earth fill	....
V_1	Gravel fill	....
V_2	Sand fill	....
W	6-in. concrete	1.25
W_1	6-in. granitoid	2.30
W_2	4-in. hassam	1.25
W_3	6-in. hassam	1.61
X	Amiesite on stone	1.28
X_1	Amiesite on 6-in. concrete	2.18
X_2	Bithulitic on 6-in. concrete—wood block headers	2.75
P_4	Asphalt on 6-in. concrete—wood block headers	2.75

used per cubic yard were $1.20 for stone; 60 cents fo gravel; $1 for Telford and stone; 70 cents for Telfor and gravel; and $5 for concrete sub-foundation. T facilitate matters, a table was prepared giving th amount of ballast in cubic yards as a function of th surface area of the layout for each depth of ballast.

All grading was reduced to three types; and a tabl was prepared showing the amount of grading, for eac height of rail, as a function of the total surface are of the layout. (See Table II.) The correspondin prices used for the three types of grading showed grading in ordinary earth, gravel or sand at 80 cents pe cubic yard; grading in macadam, bituminous macadam granite block or cobble on earth foundation at 90 cent per cubic yard; all other grading at $1.75 per cubi yard, due to the presence of a hard base underneath th pavement.

The yardage of pavement was obtained by means o a planimeter from the detailed plans of the layouts an where more than one type of pavement was present i the same layout measurements were taken in the fiel to determine the amount of each. Table III gives th various types of pavement encountered and the corresponding prices per square yard.

Special Curves.—As stated before, all special curve were so valuated that only their additive cost over ordinary tangent track was recorded, the items affecte being rail and track laying. The total length of curve figured as single track was obtained from the detaile plans, and from tables, prepared to show cost pe foot of all types of special rail and ordinary tangen track rail, it was an easy matter to obtain the desire result.

Crossings.—All crossings were treated the same a special curves; that is only their additive cost, ove ordinary tangent track displaced, was considered. Her also, only the items of rail and track laying wer affected. After careful examination of records, it wa found that the allowance of $1 per foot of single trac displaced by the crossing would very nearly represen the excess cost of the track laying over the cost of th same item per foot of ordinary tangent track displaced The actual costs of most of the crossings were available, but in the few cases where this was not the case the law of averages was applied.

Crossovers.—Values shown under crossovers likewis show only the additive cost of the work over that of ordinary tangent track displaced. Here the items affected are those of rail, ties and track laying. The excess track laying was taken as 10 per cent of the excess cost of rail in tongue switch and mate work, and 20 per cent in the case of split-switch work, where most of the rail bending and cutting was done in the field. A table was prepared showing the total cost of crossovers for each type of rail and the cost of the ordinary tangent track rail displaced, so that by subtracting one item from the other, the additive cost of the crossover rail was obtained. A table was also prepared showing the additive number of ties required for each length and type of crossover over the number ordinarily required for the same length of tangent double track. By the use of this table the item of excess ties became a very simple matter.

TABLE V—FINAL REPRODUCTION COST FIGURES OF SOME OF THE TYPES OF SPECIAL TRACKWORK LAYOUTS

Layout	Identifying	Cost to Reproduce							Notes †
		Rail	Ties	Track Laying	Grading	Ballast	Pavement	Total	
200 radius left hand turnout..	19	$534.00	$56.00	$80.00	$119.00	$9.00	$474.00	$1,272.00	7-ft., 95-lb. T-Rail, wooden ties, 3½-in. gravel ballast, wood block on concrete.
Single track branch-off.......	14	$642.00	$40.00	$100.00	$86.00	$7.00	$229.00	$1,104.00	7-ft., 110-lb. G-Rail, wooden ties, 3½-in. gravel ballast, asphalt on concrete.
Single track "Y"............	4	$782.00	$87.00	$117.00	$164.00	$25.00	$220.00	$1,395.00	4½-ft., 56-lb. T, wooden ties, 41 cu. yd. gravel ballast grading, 32 yd. at 80 cents, 79 at $1.75, pavement 176 yd., concrete 72 earth fill.
Single track three part "Y" with crossing..............	7	$2,526.00	$114.00	$505.00	$200.00	$15.00	$647.00	$4,007.00	7-ft., 110-lb. G, wooden ties, 3½-in. gravel ballast, brick on concrete.
Single track three part "Y"....	5	$1,508.00	$117.00	$302.00	$115.00	$19.00	$720.00	$2,781.00	5-ft., 80-lb. T, wooden ties, 3½-in. gravel ballast, granite block on earth.
Double track branch-off.......	16	$1,683.00	$120.00	$337.00	$153.00	$22.00	$833.00	$3,148.00	7-ft., 95-lb. T and 7-in., 110-lb. G, wooden ties, 3½-in. gravel ballast, granite block on earth.
Double track three part "Y" with crossings.............	12	$6,470.00	$221.00	$1,294.00	$382.00	$28.00	$1,472.00	$9,867.00	7-ft., 110-lb. G, wooden ties, 3½-in. gravel ballast, 20 yd. brick on concrete, 444 yd. wood block on concrete.
Double track through "Y".....	10	$3,316.00	$169.00	$663.00	$363.00	$29.00	$1,410.00	$5,950.00	7-ft., 110-lb. G, wooden ties 3½-in. gravel ballast, 60 yd. macadam, 420 yd. wood block on concrete.
Double track three part "Y"...	11	$5,344.00	$325.00	$1,069.00	$745.00	$55.00	$2,960.00	$10,498.00	7-ft., 110-lb. G, wooden ties, 3½-in. gravel ballast, wood block on concrete.
Double track connected branch-off with crossings..........	13	$4,395.00	$188.00	$879.00	$331.00	$25.00	$1,303.00	$7,121.00	7-ft., 95-lb. T, 47-in., 110-lb. G, wooden ties, 3½-in. gravel ballast, 395 yd. wood block on concrete, 15 yd. brick on concrete.
Single track connected branch-off with crossing...........	8	$1,905.00	$75.00	$381.00	$243.00	192.00	$396.00	$3,192.00	9-ft., 125-lb. G, wooden ties, 31 yd. stone ballast, 31 yd. concrete ballast base, asphalt on concrete.
Grand union................	18	$13,375.00	$585.00	$2,675.00	$1,510.00	$1,190.00	$2,460.00	$21,795.00	9-ft., 125-lb. G and 9-in., 151-lb. G, wooden ties, 192 yd. stone ballast, 192 yd. concrete ballast base, asphalt on concrete.
Split Switch T.O., No. 8 Frog-Length 136-ft...............	19	$336.00	$77.00	$67.00	$69.00	$13.00	....	$562.00	5-ft., 80-lb. T, wooden ties, 3½-in. gravel ballast, earth fill.

All work "bolted insert work" unless otherwise mentioned. * The numbers in this column refer to the types of layouts shown on page 264. † G in last column stands for girder.

Cast Welds.—All cast welds were assumed at $21 each. This price was used throughout all the layouts where cast welds made their appearance.

Turnouts.—The different turnouts were valuated so as to show the total cost of the work, and in order to simplify matters they were all reduced to four types: "A," "B," "C" and "D" in the case of tongue switch and mate work. The types "A" and "B" represent side-turnouts 67 ft. long and 93 ft. long respectively, with radii of 100 ft. and 200 ft.; while "C" and "D" represent diamond ends 51 and 67 ft. long respectively with radii of 100 ft. and 200 ft. The length of a turnout represents the distance from switch joint to a point where the two tracks reach full centers. Split-switch turnouts were designated by their length from switch point to full centers and so all turnouts on the system were made to come under the above general types, in order to make all practical headway. The items affected under turnouts are: Cost of rail, ties, track laying, ballast, grading and pavement. The value for rail was arrived at by using the values for switches, mates and frogs shown by a prepared table and then adding the cost of the remaining rail. A table was also prepared showing the number of ties used and total surface area excavated in square yards for each type and length of turnout. (See Table IV.) From this table the number of ties, and the amount of ballast and grading, both a function of the surface area excavated, were ascertained and the cost thus figured by the application of unit prices. The pavement item was similarly obtained.

Special Layouts.—All other layouts not yet mentioned were classed as special layouts. In these cases the total cost of the work was obtained in every case rather than mere additive cost over tangent track. The limits of the special trackwork of this kind are also shown on page 264. In the case of double track branch-offs, where the special trackwork begins at a switch joint, or point, on the first track, the corresponding limit of the work on the second track was obtained by squaring across from the limiting point on the first track regardless of where the switch joint, or point, occurs on the second track. This process caused some ordinary tangent track rail to be included, the price of which, however, was assumed the same as for ordinary tangent track. The value for rail was obtained by using the figures for switches, mates and frogs, as shown in the prepared table mentioned above, and adding to them the cost of all ordinary rail and the cost of the remaining special rail, as so much per foot of single track, as shown by prepared tables. Rail in single track branch-offs was given the price of special rail in the case of tongue switch and mate work, and the price of ordinary tangent track rail in the case of split-switch work, where the added cost of curvature was taken care of by an increase in the track laying item. The number of ties was estimated in each case and averaged between 60 per cent and 90 per cent of the total length of the work figured as single track, depending upon the nature of the layout. The track laying item was assumed as 15 per cent of the total cost of the special trackwork, in the case of single track branchoffs of tongue switch and mate work, and 20 per cent in all other types of special layouts. The items of ballast and grading, both functions of the surface area of the excavation for the layout, were easily calculated and priced. This area was obtained, as mentioned before, by the use of a planimeter on the detailed plans of the different layouts. The pavement also was readily priced, except where more than one type occurred in any one layout. If this was the case, measurements and estimates were made in the field to determine the proportions of each.

Carhouses, Sidings and Spurs.—The values of special trackwork at carhouses, sidings and spurs also represent the total cost of the work. The treatment was the same as for special layouts, except that more attention had to be paid to the field work of inspecting to determine the nature of the construction, which in most cases was found to be of the "bolted" or "built-up" type, minus the hard center qualities. Here again some of the rail was given the price of special rail and some that of ordinary tangent track rail, depending upon whether it was shop bent, or bent in the field, and wherever the latter was the case, the price for ordinary tangent track rail was applied, with a corresponding increase, however, in the track laying item.

ADVANTAGE OF GOOD OFFICE RECORDS DEMONSTRATED

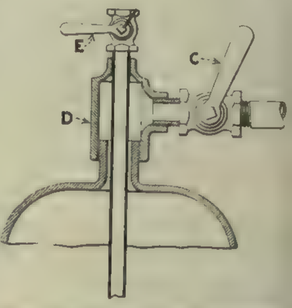
From the above it is obvious that the better the office records the less the amount of field work to be performed, and consequently a saving in time must be the result. The writer found it of great advantage to prepare the valuation forms for all special trackwork locations beforehand, so that when the track statements were gone over, some of the items, such as types of rail, depth and kind of ballast, and grading, and kind of pavement, could be recorded on each form, leaving only the computations of the amounts under each item. These were readily obtained from the detailed plans of each location.

The most helpful instrument during these calculations was the planimeter, by means of which the surface area of each layout was obtained; and since both the grading and ballast items were taken as functions of this surface area found, one can readily note the saving in time and effort afforded by the use of the planimeter. The only field work left to do was that of determining the proportions of each kind of pavement in layouts where more than one type was present, and the previously mentioned inspection of carhouse layouts and spur tracks, where detailed plans of the work were not always available.

In concluding, the writer wishes to emphasize that in a valuation of this kind carefully prepared tables and a systematic method of procedure, both in the matter of keeping office records and in the valuation itself, are the real keys to a substantial saving in both time and money.

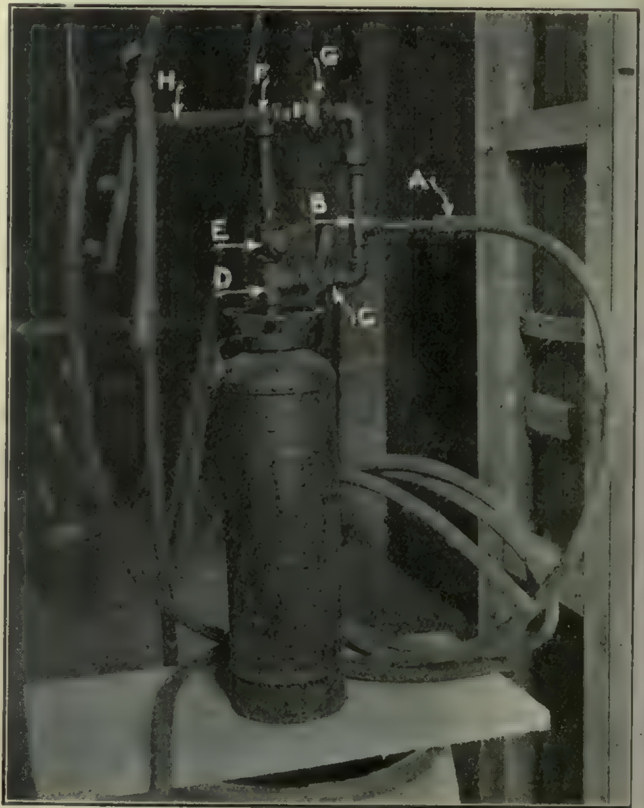
Paint Spraying Equipment Made from Discarded Fire Extinguisher

THE Second Avenue Railroad, New York, had a number of trucks that required repainting and Charles E. Chalmers, receiver for the railroad, conceived the idea of using an old fire extinguisher to assist in and speed up this work. Accompanying illustrations show the equipment as constructed. All that was necessary was to connect up the piping so as to provide for attachment to the shop air system and connect in the various cut-out cocks for controlling the air and spraying operations.



AIR AND PAINT CONNECTIONS TO FIRE EXTINGUISHER TOP

Referring to the accompanying halftone, the hose on the right marked A is for attachment to the shop's air system, while that on the left marked H is used for spraying the paint. In operating the equipment the valve at C is first opened, which admits air pressure to the top of the paint contained in the fire extinguisher body. A small pipe runs to the bottom of the fire extinguisher and is connected to the valve so that when pressure is applied to the top the paint rises in this pipe and by opening the valve E the paint will flow through the connections at F and H. In order to give air pressure for the spraying of the paint the valve at G is regulated as desired. The line drawing shows the attachment of the pipe which goes to the bottom of the paint receptacle and the method of admitting air to the top of the receptacle. The fire extinguisher body has sufficient capacity to hold 2 gal. of paint.



HOME-MADE PAINT SPRAYING EQUIPMENT

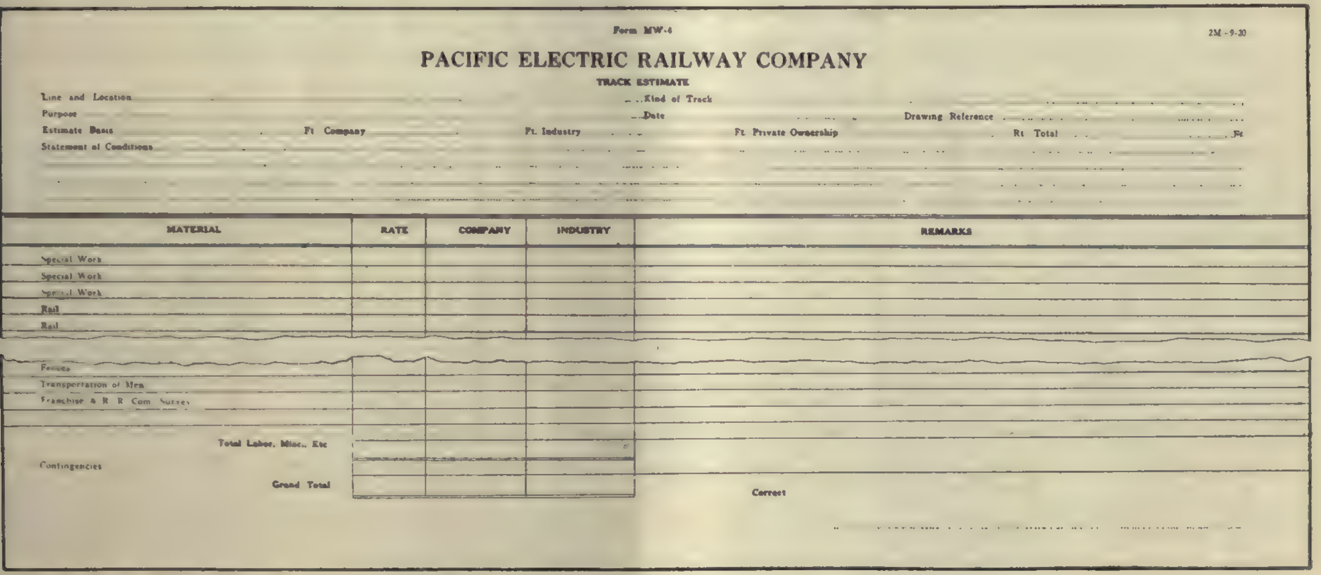
Insuring Accuracy in Trackwork Estimates

Engineering Department of Pacific Electric Railway Has Developed a System Which Insures a Supply of Accurate Cost Data to Field Engineers and Eliminates Lost Motion in the Cost Department

By Clifford A. Elliott
Cost Engineer Engineering Department, Pacific Electric Railway, Los Angeles, Cal.

Since 1919 the engineering department of the Pacific Electric Railway has used a printed form for estimates of work on tracks. This was prepared for the convenience of the field engineers' bureau, where all such estimates are prepared. It is shown in Fig. 1.

The system involving the use of this form was designed to provide a consistent estimating standard and to include every detail item essential to a standard estimate. Now, when the estimate is accepted and turned over to the work order bureau of the engineering department for the preparation of the work order this bureau can do its work promptly. Otherwise, there might be delays due to necessary interviews with the field engineer, the author of the estimate, with requests for explanations on points not clear to the accountants in the work order bureau. Such lack of clearness might have been due to the field engineer's lack of attention to required details. While under the present plan there is no desire to make an accountant of the engineer, the plan makes it his duty to furnish and list every detail that will assist the accountant in his work of taking the estimate apart for work order purposes.



Form MW-4 2M-9-20

PACIFIC ELECTRIC RAILWAY COMPANY

TRACK ESTIMATE

Line and Location ____ Kind of Track ____
Purpose ____ Date ____ Drawing Reference ____
Estimate Basis ____ Ft Company ____ Ft. Industry ____ Ft Private Ownership ____ Ft Total ____ Ft
Statement of Conditions ____

MATERIAL	RATE	COMPANY	INDUSTRY	REMARKS
Special Work				
Special Work				
Special Work				
Rail				
Rail				
Fences				
Transportation of Men				
Franchise & R R Com Survey				
Total Labor, Misc., Etc				
Contingencies				
Grand Total				Correct

FIG. 1—TRACKWORK ESTIMATE FORM, PACIFIC ELECTRIC RAILWAY

General items: Line and location; kind of track; purpose; date; drawing reference; estimate basis (in feet) for company track, industry track, private ownership track, and total; statement of conditions.

The following items are tabulated: Special trackwork, rail, joints, compromise joints, bolts, tie plates, rail braces, nut locks, guard rails, separators and bolts, spikes, derails, bumpers, track bonds, track cross bonds, numbers and kinds of signs, ties, special trackwork timbers, total of above, store expense, ballast, total material, grading, trackwork (new construction), trackwork (remove or shift), placing special trackwork, placing bumpers, ballasting (including grouting), bonding, paving (new work), paving (excavating old work), culverts, bridges, structures (new), structures (changes or removals), work-train service (track), work-train service (ballasting), freight on track material, freight on ballast, transportation of men, franchise and railroad commission survey, total labor, miscellaneous, etc., contingencies, grand total. Listed also are companion work orders, 1, 2, etc.

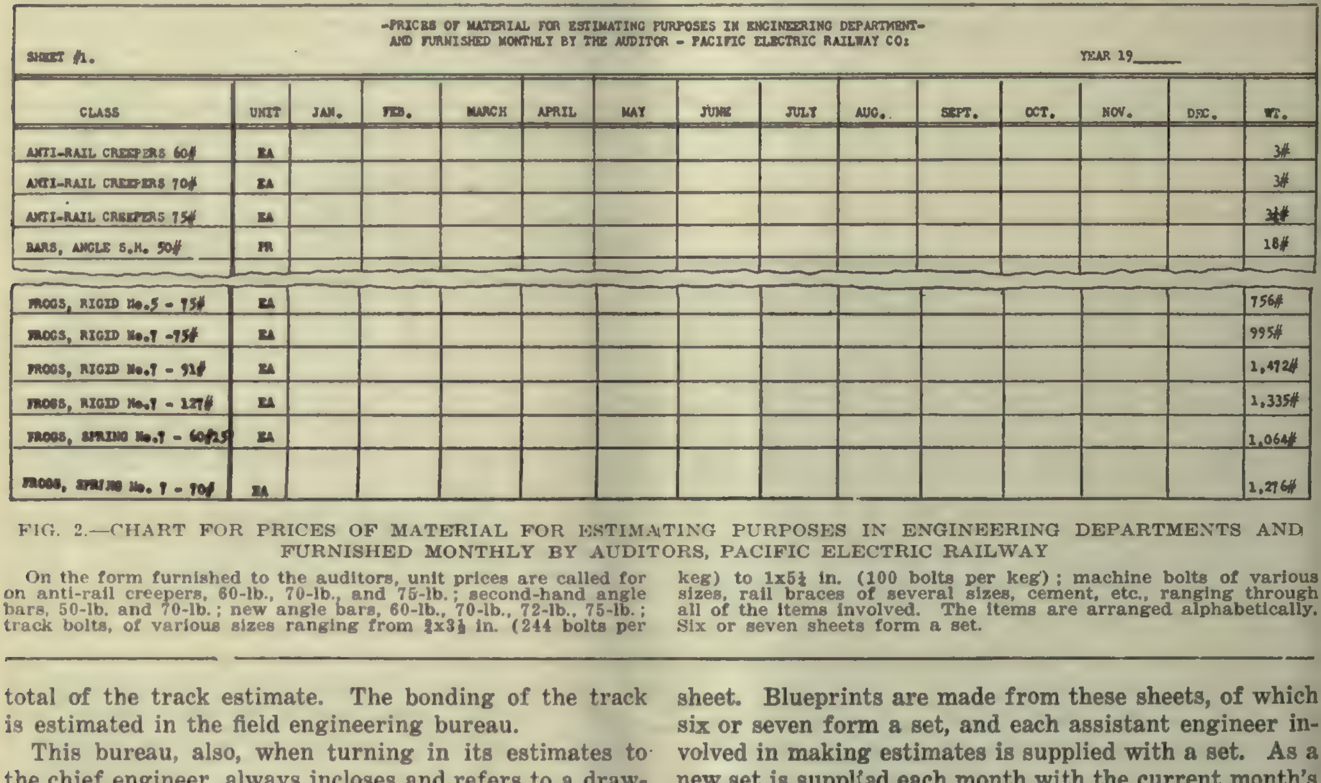
The present estimating system expedites the work of every one concerned. The details as supplied by the estimator aid the office engineer in promptly reviewing the figures and passing them along to the chief engineer for consideration and for approving the issuing of the work order.

The estimates are written out in pencil. Triplicate copies are made, one copy being retained in the field engineering bureau and two transmitted to the chief engineer's main office. When the estimated cost of a proposed project is transmitted to the management, total figures are used only, but detail figures are furnished if requested. Space is provided on the form for features not covered under the printed headings. For example, if the estimate covers a replacement job, the salvable material can be listed and classified by the estimator. Again, culvert and street improvement plan references as prepared by municipality engineers are shown when the estimate covers a reconstruction and paving job. This plan also provides a method for dividing the expense of a project with outsiders, as for instance in the construction of an industrial spur track where a portion of the expense is borne by the industry served. With reference to the grading item, sometimes the industry desires to do the grading for the spur, as it may have a grading outfit available for the construction of its warehouse which would lower the grading cost if this work is done at the same time as the warehouse work. In this instance the estimator merely indicates the yardage of the company's grading and indicates the grading for the industry's portion, but gives no unit cost or total grading cost for the outsider. In the "remark" column he states, for example, "Industry to perform grading from the north line of 35th Street to end of spur."

When the item of ballast enters into a track estimate, depth and class may be stated. Where there are items of structures or culverts that involve considerable structural study and plans, then the individual engineer who furnishes such figures for incorporation in the estimate is quoted; that is, a note is made at the side of that figure that it was furnished by the person whose name is stated.

The same practice is followed when there is an unusual item of cost required in the estimate, such as a large layout of solid manganese special trackwork.

Another illustration of the use of the form for recording additional data is this: When overhead construction figures are required on any track project, the estimator, when he begins to make his estimate, immediately fills out a standard printed form of letter request on the electrical superintendent, stating that "as per an inclosed drawing," a certain track construction is proposed and that the estimated cost of the overhead construction or changes is required. When the overhead construction figures are received they are added to the total of the track estimate. The bonding of the track is estimated in the field engineering bureau.



-PRICES OF MATERIAL FOR ESTIMATING PURPOSES IN ENGINEERING DEPARTMENT-
AND FURNISHED MONTHLY BY THE AUDITOR - PACIFIC ELECTRIC RAILWAY CO:

SHEET #1.

YEAR 19_____

CLASS	UNIT	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	WT.
ANTI-RAIL CREEPERS 60#	EA													3#
ANTI-RAIL CREEPERS 70#	EA													3#
ANTI-RAIL CREEPERS 75#	EA													3½#
BARS, ANGLE S.H. 50#	PR													18#
FROGS, RIGID No.5 - 75#	EA													756#
FROGS, RIGID No.7 -75#	EA													995#
FROGS, RIGID No.7 - 91#	EA													1,472#
FROGS, RIGID No.7 - 127#	EA													1,335#
FROGS, SPRING No.7 - 60#25	EA													1,064#
FROGS, SPRING No. 7 - 70#	EA													1,276#

FIG. 2.—CHART FOR PRICES OF MATERIAL FOR ESTIMATING PURPOSES IN ENGINEERING DEPARTMENTS AND FURNISHED MONTHLY BY AUDITORS, PACIFIC ELECTRIC RAILWAY

On the form furnished to the auditors, unit prices are called for on anti-rail creepers, 60-lb., 70-lb., and 75-lb.; second-hand angle bars, 50-lb. and 70-lb.; new angle bars, 60-lb., 70-lb., 72-lb., 75-lb.; track bolts, of various sizes ranging from ¾x3½ in. (244 bolts per keg) to 1x5½ in. (100 bolts per keg); machine bolts of various sizes, rail braces of several sizes, cement, etc., ranging through all of the items involved. The items are arranged alphabetically. Six or seven sheets form a set.

This bureau, also, when turning in its estimates to the chief engineer, always incloses and refers to a drawing prepared by the field engineers to accompany all estimates from the bureau. When the work order is prepared, this field drawing is used by the drafting department in preparing a standard 8½-in. x 13-in. blueprint plat that "supports" the work order transmitted to the management. On one corner of the work-order blueprint plat is always shown a marginal location map of a portion of the railway system.

ACCURATE COST DATA USED AS A BASIS FOR ESTIMATES

This system of estimating involves dependable cost-keeping records. The unit costs are furnished the field engineers for their cost books whenever the costs of performing similar work are known to have changed. At a certain period of the year the cost engineer supplies any changes in the unit cost for installing turnouts, track laying, placing of ballast, or any other items of cost that are essential for preparing conservative estimates. For instance, a weighted average is arrived at on the number of hours time of foreman and laborers to install a turnout. Fifteen examples are taken and the result of the time engaged per turnout by the existing average rate of pay determines a standard cost for this one particular item. This rate remains the same until there is a change in the wages paid.

To secure information as to material prices, tracing cloth sheets or vellum paper 14 in. by 18 in. in size were ruled in the drafting room as shown in Fig. 2. Then a list of all classes of material used in estimates was typewritten on these sheets, a sheet of carbon paper being used to impress the writing on the back of the sheets so as to facilitate printing. Brown negatives made from these sheets are transmitted to the auditor on the first of each month and he is requested to insert the current monthly prices of the material in the columns provided. He is supplied with drafting-room copying ink and is instructed to write in the prices with heavy lines to insure good printing qualities of the sheet. Blueprints are made from these sheets, of which six or seven form a set, and each assistant engineer involved in making estimates is supplied with a set. As a new set is supplied each month with the current month's prices, the engineers can compare prices with previous ones to determine the correctness of their estimates. With respect to prices on material not in store stock but on order, such as the year's rail, rail fittings, tie and special work requirements, the stores department furnishes a monthly statement of all rail and rail fittings on hand or the quantity on order. Then the field engineer, in estimating, can determine whether he is estimating on material in stock at current prices or material on order.

For materials on order the engineers are given a circular every three months or every six months, stating the costs of these materials. Thus an engineer may make an estimate for the construction of a line extension, and knowing that it will be six or eight months before the line will be constructed, if at all, he may use in his estimate prices on rail and fittings based on supplies on order.

The following provision is made for conservative estimating on special trackwork to be used on a job, such for example as a split-switch or switch-and-mate layout that is not of standard design, but of special-radius type, and not in stock: At certain periods of the year, or as conditions and prices may change, the field engineers are supplied by the cost engineer with the weighted average of the cost per pound for shop-made special trackwork layouts; also, the weighted average of costs of solid manganese layouts secured from the East. With this unit cost at hand the estimator, from his special trackwork drawing or from one of a similar layout previously designed and on file, can calculate the weight of the proposed layout and arrive at a conservative cost figure in his estimate for such classes of special trackwork as it is necessary for him to include.

For use in estimating bonding work costs in any track estimate, during certain periods of the year, as material and labor prices change for this class of work, an estimate sheet of the cost of material and labor for bonding of a switch, a railroad crossing, a mile of track, open type and girder-rail type in paved streets, etc., is compiled. This is neatly typed and bound, and is supplied to the field engineers. The bonding estimate is made up in complete detail so it fits into the items listed on the track estimate form.

CHECKING UP THE ESTIMATES

As to such items of cost, required for estimates, as those of work motor-car service, transportation of men by special cars, company freight haul and other numerous fixed charges determined by the auditor as entering into the cost of the project, as well as current salvage material prices, these are always available in the field engineers' bureau in a departmental circular, advising of such rates and the changes in them from time to time.

Before the field engineer signs an estimate for transmission to his superior, he consults the assistant engineer in charge of the reconstruction and construction track forces, as well as several supervisors, to secure their judgment as to whether the work can be performed at the estimated labor cost. He then notes on the lower left-hand corner of the estimate form that he has reviewed the estimate with the persons named.

On account of the large number of detail items required in track estimates and the limited time of the field engineers to comply with the emergency request to compile and submit their estimates, a schedule as shown in the accompanying table has been prepared. This is taken into the field and in the study of the project the engineers check off the items on the schedule to determine from observation, if such and such items should be included. Thus there is no chance for a "slip-up" or the omission of any item. This conserves the 10 per cent contingency item which is added to the estimate to include the unforeseen or overlooked items of cost.

WHAT THIS PLAN ACCOMPLISHES

In conclusion, there are several benefits derived from this system of estimating. First, in going so extensively into the details there is the least possible chance of omission of important items. This results in a conservative estimate that will not, as a rule, defeat the project. Then, it obviates the past practice of permitting these unforeseen items to be taken up in the contingency item. Second, the recent effectiveness of the Interstate Commerce Commission Revised Order No. 3, with respect to compilation of certain valuation reports by common carriers, necessitates that the estimate be prepared in minute form, as the work order when submitted must be compiled with great care as to details and with respect to units of material and labor costs covering new projects or physical changes in existing property. Third, it is gratifying to find that the final unit cost of the work, with very few exceptions, properly blends or corresponds with the terms and detailed units of the estimate.

Incidentally it may be said that when a municipality has condemned the company's right of way for street purposes, the estimating form is used in submitting the case to the court. It is typewritten and exhibited to show the estimated severance damages to the tracks of the cost to the company of any physical changes involved by opening the street. For this purpose the form permits the exhibiting of the data to the court and its engineers, with the details conveniently arranged and easily explainable.

FIELD CHECKING SCHEDULE—PACIFIC ELECTRIC RAILWAY

Right of Way:
- Width of present right of way.
- Additional right of way required.
- Fences, direction of property lines, etc.
- Adjacent buildings, structures, trees, etc.
- Curbs.

Track:
- Location as to right of way.
- Track centers or location as to trolley poles.
- Weight of rails.
- Joints.
- Bonding.
- Tie plates.
- Ballast.
- Culverts.
- Drainage.
- Condition of constructed tracks.
- New track centers, regard to clearances, overhead, etc.

Grading:
- Report on present roadbed, cut or fill and amount.
- Width of roadbed, berms, etc.
- Character of material.
- Material available.
- Possibility of wasting material.
- Drainage. Trees, etc.

Overhead:
- Present pole line.
- High tension.
- Foreign pole lines, high tension, telephone, etc.
- Possible location of new poles.
- Possibility of guying new poles when necessary.

Miscellaneous:
- Water and other pipe lines.
- Streets, paving, grades.
- Curbs, passenger landings.
- Road crossings, public or private, type required, culverts.
- Roadway signs to be moved or installed.
- Block signals.
- Franchises, etc.
- Possibility as to operation.
- Derail required.
- Any special conditions not covered by above.

The American Engineering Standards Committee has officially approved as "American standard" the code of lighting for factories, mills, and other working places, based upon earlier codes issued by the Illuminating Engineering Society and recently revised by a sectional committee under the sponsorship of this society. The code consists of rules covering the minimum requirement, from the point of view of safety, for illumination of traversed spaces during the time of use, methods for the avoidance of glare, and for exit and emergency lighting. Supplementary to the code are numerous suggestions relative to illumination values.

Analysis of Public Accidents

Those from Street Cars Are Decreasing, While Those from Automobiles Are Increasing, Says the National Safety Council

According to a report of the Committee on Public Accident Statistics, Public Safety Section, National Safety Council, there were approximately 75,500 fatal accidents in the continental United States during 1919, of which 55,500 were to males and 20,000 to females. The committee says that this estimate is made from the United States Census Bureau's statistics for the registration area, which comprises over 80 per cent of the population of the entire country. Following is a distribution of these accidents by more important causes.

FATALITIES IN THE CONTINENTAL UNITED STATES DURING 1919.

	Males		Females	
	Number	Rate per 100,000	Number	Rate per 100,000
Automobiles	7,372	13.77	2,453	4.77
Railroads	6,878	12.85	895	1.74
Falls	6,503	12.15	5,370	10.44
Drownings	6,302	11.78	916	1.78
Burns (exclusive of conflagrations)	3,314	6.19	4,588	8.92
Mines	2,686	5.02	1	..
Firearms	2,483	4.64	414	0.81
Machines	2,446	4.57	121	0.23
Deleterious gases	2,417	4.52	1,139	2.21
Miscellaneous vehicles	2,145	4.01	284	0.55
Street cars	1,875	3.50	487	0.95
Poisoning, other than above	1,359	2.54	821	1.60
All other causes	9,640	18.00	2,636	5.12
Total	55,420	103.54	20,125	39.12
Total, 1914	58,701	117.24	18,338	38.10

AUTOMOBILE AND OTHER TRAFFIC FATALITIES

Pre-eminent among the preventable causes of death stands the automobile. In 1915 there were 2,445,664 automobiles registered in the United States, which caused approximately 5,900 fatalities. In 1920, with 9,211,295 automobiles in use, the number of deaths mounted to about 10,640. These figures exclude the fatalities which occurred as the result of collisions of automobiles with heavier vehicles such as railway engines and street cars. Such fatalities represent about 7 per cent of all other automobile fatalities, so a complete estimate of the automobile deaths in the United States for the last year reaches the figure of 11,358.

These estimates for 1920 are made possible by statistics on automobile fatalities for sixty-two cities of the United States which are summarized in the following table. The assumption was made that the percentage of increase (1920 over 1919) shown for the sixty-two cities was approximately the same as the rest of the country.

AUTOMOBILE FATALITIES IN SIXTY-TWO CITIES OF THE U. S.
(Rates per million population)

		Fatalities	
Year	Population	Number	Rate
1915	23,317,162	1,831	78.5
1916	23,982,727	2,321	96.8
1917	24,508,032	3,044	124.2
1918	25,033,352	3,444	137.6
1919	25,560,244	3,561	139.3
1920	26,086,355	3,880	148.7

It is significant to note that while the automobile death rate has greatly increased during the last six years, the fatality rate from other types of vehicles has steadily declined. The table below shows the facts.

During this six-year period the automobile fatality rate in these thirty-five cities increased 89.0 per cent while street car fatalities showed a decrease of 15.3 per cent, railway fatalities a decrease of 25.1 per cent, and "other vehicles" a decrease of 52.0 per cent.

HIGHWAY VEHICULAR FATALITIES IN THIRTY-FIVE CITIES OF THE UNITED STATES, 1915-1920
(Rates per million population)

		Automobile		Street Car		Railway		Other Vehicles*		All Vehicles	
Year	Population	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1915	15,860,800	1,274	80.3	559	35.2	860	54.2	403	25.4	3,096	195.2
1916	16,206,450	1,565	96.6	668	41.2	1,057	65.2	497	30.7	3,787	233.7
1917	16,551,899	2,057	124.3	785	47.4	1,078	65.1	388	23.4	4,308	260.3
1918	16,897,362	2,330	137.9	787	46.6	1,014	60.0	359	21.2	4,490	265.7
1919	17,244,398	2,468	143.1	576	33.4	723	41.9	265	15.4	4,032	233.8
1920	17,591,038	2,670	151.8	525	29.8	714	40.6	214	12.2	4,123	234.4

* Mostly horse-drawn, but including bicycles, motorcycles and airplanes.

Letter to the Editors

Further Views on the California Resolution

SOUTH BEND, IND., Feb. 13, 1922.

To the Editors:

The California resolution on BUS TRANSPORTATION shows beyond a doubt the loyalty of its signers to the electric railway industry, but in the minds of many of us the effort is uncalled for or misdirected. I believe that sober second thought will convince the authors of their misapprehensions as to both the purpose and the effect of this publication.

The bus as a competitor of long established systems of transportation is no longer a myth, but is a solid, established and substantial reality. It will avail us nothing to ignore this fact, and it will avail us but little to attempt the obstruction of further development, within the limits of its possibilities. Even without further growth, the size of this new industry warrants and demands an organ of expression. *It will be served*, and is it not far better for us that it be served by an organ whose well established policy is co-operative instead of antagonistic? I believe the final judgment of the industry on this question will be "Yes." This effort against the ELECTRIC RAILWAY JOURNAL is futile unless we can stop similar publications. It is not the publication of BUS TRANSPORTATION that must be stopped; it is the publication of any organ of its kind. The futility of such attempts must be clear. To deny the ELECTRIC RAILWAY JOURNAL this expansion may retard the ELECTRIC RAILWAY JOURNAL, but will not avail this industry a single thing, nor hamper bus development in the least.

In a sense it is true, as the resolution says, that the electric railway industry has supported the ELECTRIC RAILWAY JOURNAL, but not a bit more than that the industry has supported manufacturers of steel rails, cars, equipment, etc. This support hasn't been charity in any of these cases. If the ELECTRIC RAILWAY JOURNAL had not been worth its cost, it is very certain that it would have received no support. It doesn't seem quite equitable to deny a business a new customer just because the old and the new are not now close friends. And it may be that by buying at the same counter they may become good friends, if not allies.

The California resolution is a well-meant protest, but I feel sure that reflection will convince these gentlemen that the resolution is uncalled for and futile and that the ELECTRIC RAILWAY JOURNAL is performing an additional service to the electric railway people by entering the bus field with the spirit and purpose that are behind BUS TRANSPORTATION.

FRANK H. WARREN,
Claim Agent Chicago, South Bend & Northern Indiana Railway.

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Effective Method of Heat Treating Steel-Wheel Tires

The Sandberg Process Which Has Been Used for Treating the Surface of Rails to Obtain Increased Life Is Now Being Applied to the Treating of Steel-Wheel Tires

THE *Tramway and Railway World* for Jan. 19, 1922, gives some information regarding the treating of steel-wheel tires by the Sandberg process. This process has been used for a number of years for treating the surface of rails, but the application to the wheels of electric railways is new. As a result of experiments with this process it is now stated that tires can be produced for electric railway use with a higher tensile strength and higher yield point than has been possible previously.

Medium carbon steels in the ordinary untreated condition have, when examined under the microscope, a coarse granular structure consisting of pockets of pearlite surrounded by bands of ferrite or pure iron. The pearlite consists of alternate lamellæ of ferrite and carbide of iron.

NEW METHOD GIVES HOMOGENEOUS STRUCTURE

The heat treatment of steel for the purpose of resisting wear has as its aim the breaking down of the coarse granular structure and the substituting of a homogeneous structure. This homogeneous structure is produced by the Sandberg process and the granular structure is entirely broken down, the pearlite having been converted into sorbite.

The changes in the structure of the steel obtained by the Sandberg process are accompanied by very decided increases in the tensile strength of the steel and in the hardness. A steel which in the normalized condition gave an ultimate breaking stress of 58 tons after treatment showed an ultimate breaking stress of 76 tons with a yield point of 58 tons, which is the same figure as the untreated ultimate strength. The elongation of 14 per cent and the behavior of the tire under the tup test show that an ample margin of safety is secured. The steel had a higher carbon content with a breaking stress after treatment of 81 tons, while the untreated tire had a breaking stress of 59 tons.

Still better results have been obtained on tires which have been ordered by one of the large tramways in England, when an ultimate breaking stress of 85 tons, with a yield point of 62 tons per square inch, was obtained with ample elongation and resistance to shock under the tup test. The Sandberg process is one which may be described as a process of slow quenching. Owing to the simplicity of the process remarkable uniformity in any batch of tires is obtained. The process consists of cooling the tire through the critical range of temperature by projecting against it, as it is slowly rotated, very large quantities of air into which atomized water is introduced. The tire is carried through the critical temperature in some three and one-half minutes, and no further heat treatment or reheating is required to complete the process.

SERVICE RESULTS ARE BEING WATCHED

Tires of this quality have not been offered to electric railways until lately, so that no actual results in service are yet available. In the early days of the process, however, a large number of the railway companies ordered trial lots, and the results obtained on these are most encouraging.

On one electric railway tires which in the untreated condition had an ultimate strength of 52 tons per square inch and in the treated condition an ultimate tensile strength of 66 tons per square inch have shown an increased mileage between shopping for wheel turning of 72 per cent, while on another electric railway the corresponding figure was 70 per cent. These tires had only an ultimate strength of 66 tons, and it is due to the improvements in the process since the time when the tires referred to went into service that much higher tensile strengths are now obtainable.

From the standpoint of maintenance costs, the increased life of tires is of the greatest importance to railway engineers, as, apart from the saving in material, considerable economies are effected in shop labor charges through the less frequent shopping of cars for wheel changing, while greater use of the car itself is obtained owing to its being out of service less frequently; in other words, the earning capacity of the capital asset is increased.

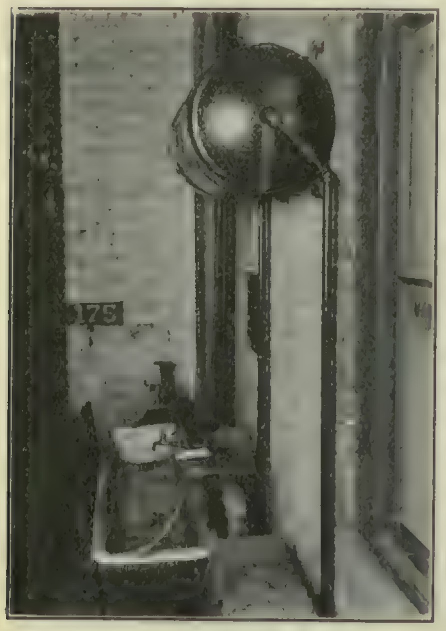
Sorbitic steel is both hard and tough without being brittle and is therefore well suited to withstand the severe shock and strains as well as the abrasion to which tires are subjected.

Next Month—Our

Annual Maintenance Issue

THE March 18 issue of ELECTRIC RAILWAY JOURNAL will contain a symposium on labor-saving methods and equipment, ingenious processes and material-handling devices. To make this comprehensive and useful your co-operation is needed. If you know of a particularly efficient method or machine which has proved effective for maintaining line, track or rolling stock tell us about it. A photograph or two will help put the idea across.

Providing Hot Water for Shop Employees



PROVIDING HOT WATER FOR WASHING

THE Second Avenue Railroad, New York, had a small washing sink at a location where connection for hot water was not convenient. This sink was located alongside a steam radiator used for heating purposes and Charles E, Chalmers, receiver for the railroad, conceived the idea of using the shop heating system to provide hot water for the shop employees while washing up. A discarded air reservoir from one of the cars was mounted on the wall over the sink by two iron straps and a connection was made from the cold water pipe to this reservoir. An additional pipe was tapped onto the system at the radiator and a ¾-in. pipe was run through the tank. This loop in the steam system has proved sufficient to provide hot water for washing purposes in this location. The air reservoir has a capacity of 30 gal. of water, which is sufficient for the number of employees who use this sink for washing, and the radiation from the hot water in the tank assists in heating the shop.

Catenary Curve Suspension Eliminates Pull-Off

By GUY B. TREAT

Chief Engineer Oklahoma Railway, Oklahoma City, Okla.

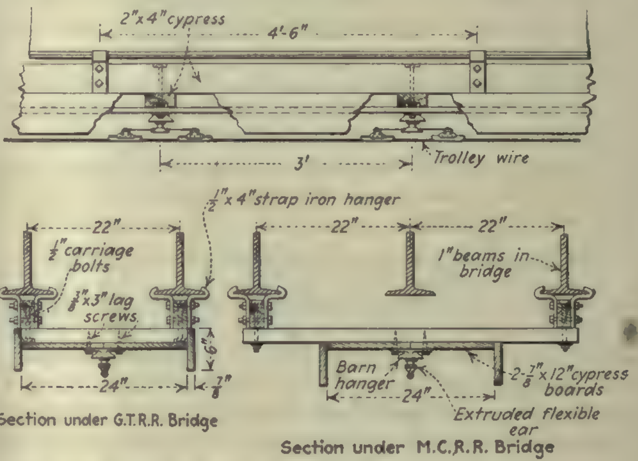
AN INTERESTING method of suspending catenaries on curves has just been tried out and installed on some of the interurban lines of the Oklahoma Railway, Oklahoma City. The accompanying photographs tell almost the complete story of what has been done. It will be noted that by the construction adopted the use of pull-offs has been eliminated altogether. Furthermore, the line has been freed of all sharp angles and the trolley of any kinks.

The principle of this suspension is to pull the messenger a little bit to one side and then put a kink in the hanger so as to keep the ear on top of the wire and give the wheel sufficient clearance. It was necessary to experiment a little in order to determine the correct length of hanger to use. This experimenting was accomplished by making some adjustable hangers as shown in one of the accompanying photographs, which consisted merely of a long rod put in the ear and fastened to an eyebolt by means of a two-bolt guy clamp, which permitted the necessary adjustment.

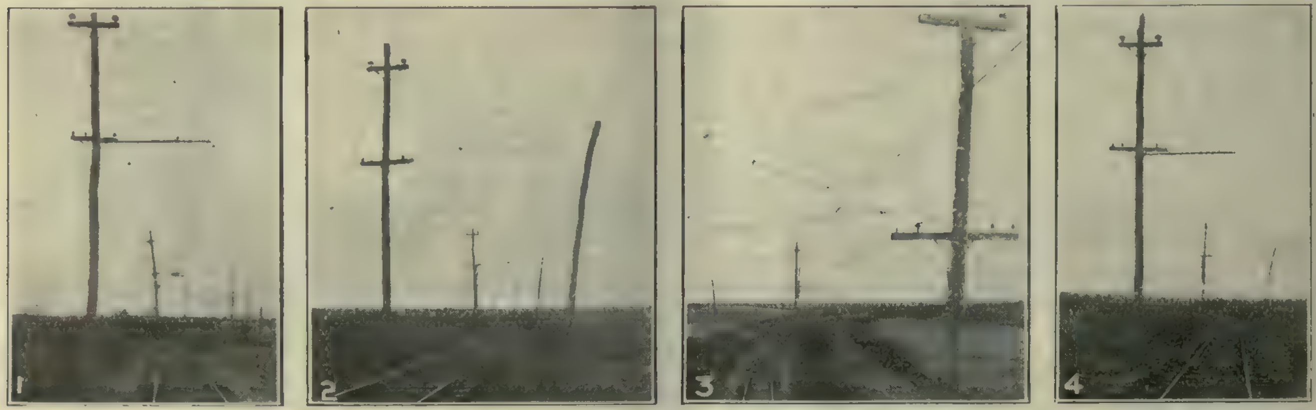
The details of this construction were worked out and performed under the direction of William H. Hahn, chief lineman for the company.

Trolley Trough Design Under Bridges

SOME typical sections of trolley troughs which have been installed under the Michigan Central Railroad and Grand Trunk Railroad bridges in Detroit by the Department of Street Railways are shown in the accompanying illustration. All lumber used is of clear cypress, brush treated with carbolineum. General Electric ⅝ in. boss, galvanized barn hangers and Ohio brass ⅝ in. boss, extruded metal flexible ears are used. It was necessary to use a total of twenty-eight hangers in the north-



TYPICAL SECTIONS OF TROLLEY TROUGHS INSTALLED IN DETROIT



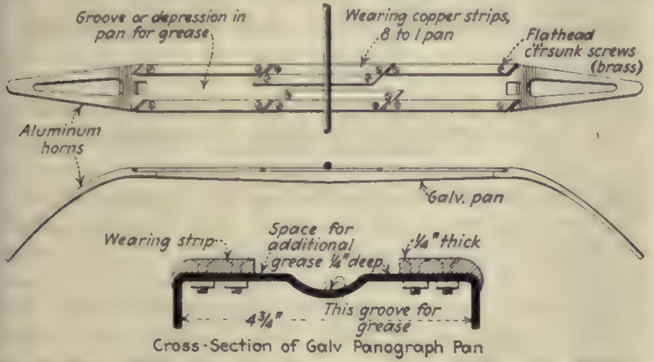
CATENARY CURVE SUSPENSION ELIMINATES PULL-OFF

No. 1—Experimental hangers were used to determine correct lengths.
No. 2—Typical new catenary construction on curves.
No. 3—Another curve showing greater detail of hangers.
No. 4—How new catenary curve construction changes into ordinary tangent construction.

bound side and twenty-nine hangers in the southbound side for this construction. Crosspieces 2 in. x 4 in. in size are installed under the barn hangers, which are held in place by ⅜ in. x 3 in. galvanized lag screws. All bolts in the wood are countersunk and the heads are filled with pitch.

Lubricating Pantograph Shoes Increases Life

ACCOMPANYING illustrations show the slider trolley or pantograph shoe construction used by the London & Port Stanley Railway of London, Canada. In operation the contact surface of this G. E. S-159-A slider trolley is kept lubricated through the application of Keystone grease No. 820 by filling in the grooved portions of the galvanized pan and also between the copper contact strips. The galvanized pan is 4¾ in. wide and 36 in. long with a deep groove running the full length through its center line. This groove is filled with grease. The copper strips are ¼ in. thick and are attached along the edge to the flat side of the pan. There are two inner central copper wearing strips and the space between the outside strips where there are no inner strips is also used for grease. Aluminum horns are attached to each end of the shoe.


Groove or depression in pan for grease
Wearing copper strips, 8 to 1 pan
Flathead c'trsunk screws (brass)
Aluminum horns
Galv. pan
Wearing strip
Space for additional grease ¼" deep
¼" thick
4¾"
This groove for grease
Cross-Section of Galv Panograph Pan

CONSTRUCTION AND METHOD OF LUBRICATING PANTOGRAPH SHOE

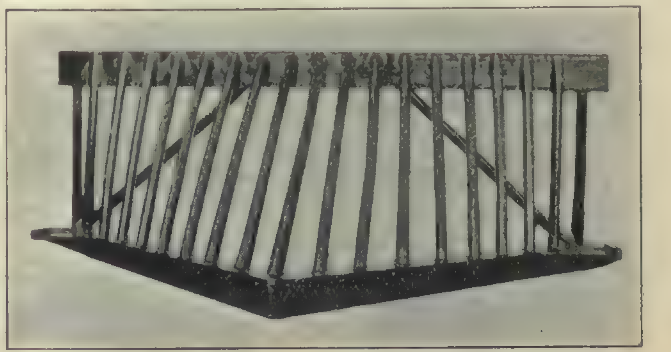
As a result of this method of lubrication a smooth wearing surface is obtained against the under side of the trolley wire and a considerably increased life is the result. The service obtained from the copper wearing strips is from 12,000 to 15,000 miles. A maximum tension of the shoe against the trolley wire of 14 lb. is maintained.

Fan Motors in Springdale Station Equipment Article

IN THE "Equipment and Maintenance" section of the ELECTRIC RAILWAY JOURNAL for Oct. 22, 1921, page 733, there appeared a description of the forced-draft fan equipment with push-button and pressure regulator control as installed at the Springdale station of the West Penn Power Company. This article stated that the installation was made by the Westinghouse Electric & Manufacturing Company. This is in error as the equipment installed was manufactured by the General Electric Company of Schenectady. Motors of the type described were developed by the General Electric Company approximately eight years ago, and installations have been made in various textile mills and mines in ventilating fan service since that time. The equipment described, however, is the first application of this type of motor with full automatic control as a power station auxiliary.

Pilot Made from Scrapped Trolley Poles

THE accompanying illustration shows a standard pilot used on the interurban cars of the Puget Sound Power & Light Company, Seattle, Wash., made entirely of scrapped trolley poles and obsolete iron.

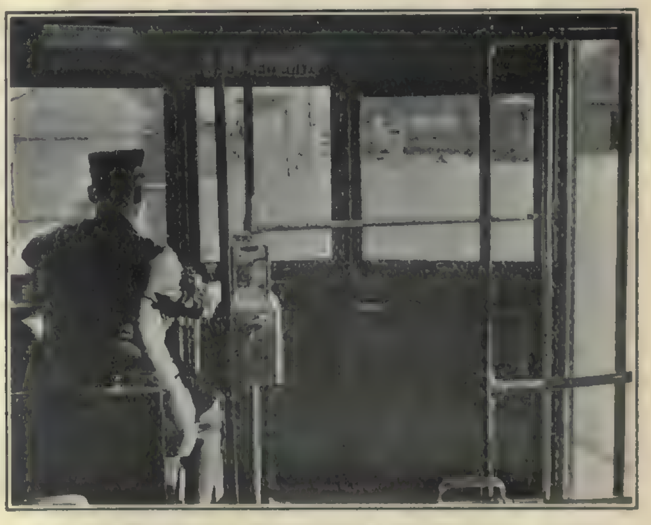


PILOT MADE FROM OLD TROLLEY POLES

This construction gives not only additional strength and durability, but also resulted in a saving of more than 50 per cent as compared with old-style wooden pilots. For welding the various lengths of poles into position both electric and oxyacetylene processes were used.

Preventing Passengers from Interfering with Car Operator's View

THE safety cars of the Los Angeles (Cal.) Railway have been equipped with a bar extending from the door to the fare box stanchion, to prevent passengers, when the car is crowded, from standing against the right front window so as to block the operator's view. The bar is attached to the upright post at the door and fits into a clip on the fare box stanchion. The fastening at the door is hinged and when the operator changes ends the bar is removed from the stanchion clip and hangs from the hinged fastener. The bar thus takes up no additional room when not in use and is very effective in preventing passengers from obstructing the view of conditions on the right side. Its removal from the stanchion clip takes but a moment and danger from accidents in congested traffic sections is eliminated.

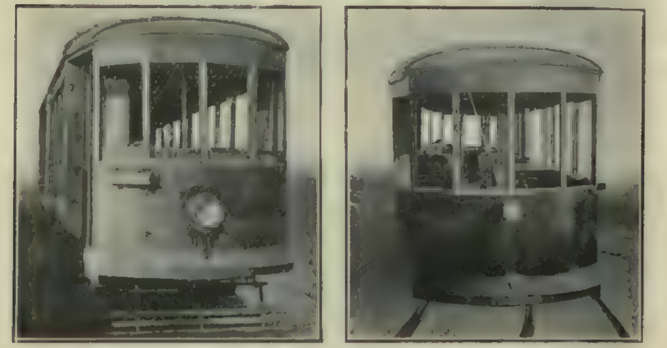


BAR FOR PREVENTING PASSENGERS FROM LEANING AGAINST RIGHT FRONT WINDOW

Welded Steel Cars in Cuba

THE accompanying illustrations show the first of some cars being built by the Camaguey (Cuba) Tramway Company, Ltd. No rivets are used in the entire steel work, as all the steel sheets and supports are electric welded. The first body which was constructed complete without running equipment cost about $2,500.

The side posts continue over the top so as to form the roof support. These are welded to the underframe, and they also form the outer half of the curtain guides. The side sheeting is of $\frac{1}{16}$-in. gage steel, pressed to a reverse curve on a 9 in. radius. The width of the car at the underframe is but 6 ft., but this is increased to 7 ft. 6 in. at a point just underneath the seat cushions.



FRONT AND REAR VIEWS OF CAR BEFORE PAINTING

SIDE VIEW OF CAR AS COMPLETED BUT BEFORE PAINTING

The cars are 30 ft. long and 10 ft. high over trolley boards. The distance from the floor to the roof is 7 ft. 6 in. The interior finish is of cherry and cherry slat seats are used. Other woodwork is natural Cuban cedar and mahogany. The flooring is $\frac{7}{8}$ in. mahogany. Agasote roofing is used except on the canopies, which are cedar covered with canvas.

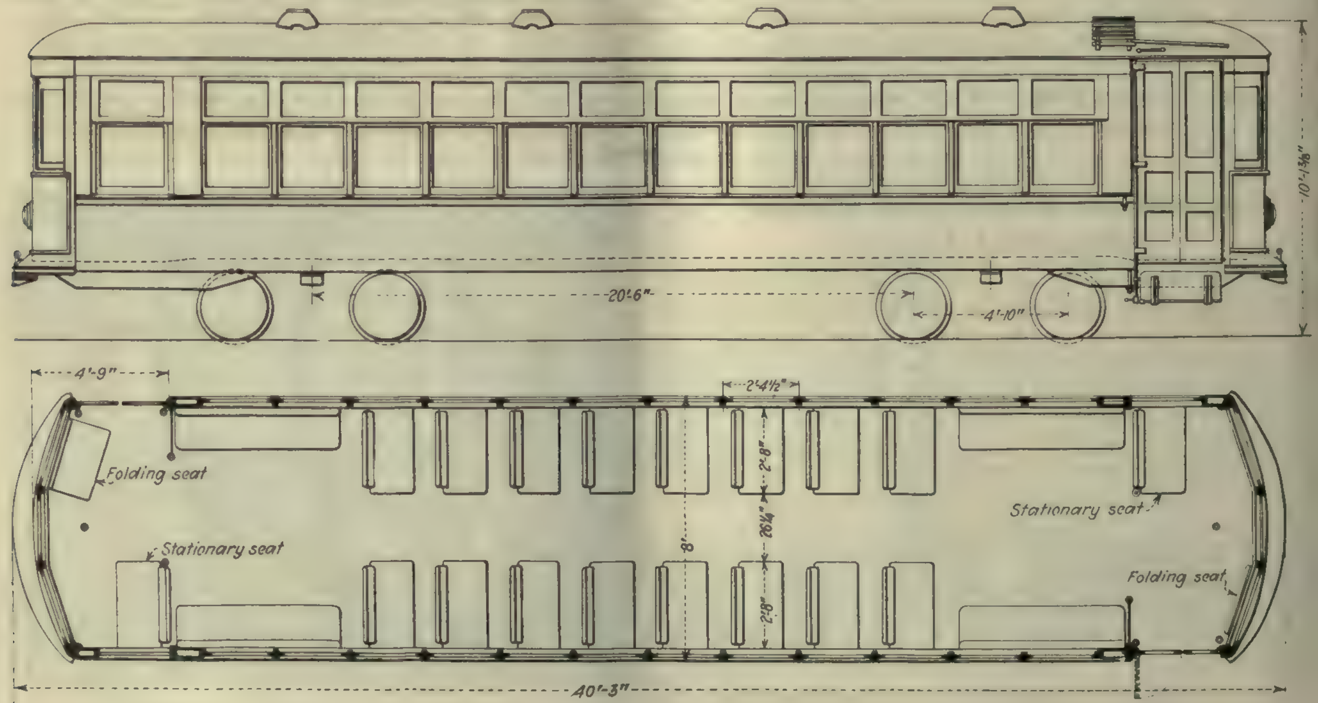
The cars are mounted on Brill 21-E trucks and have General Electric Company equipment consisting of type 258-D motors and K-63BR controllers. Other equipment used includes J. G. Brill Company's doors and seats, Ackley No-staff brakes, Pantasote curtains, Agasote roofing, H. B. life guard and Griffin cast iron wheels 30 in. in diameter.

The cars are operated on a pay-as-you-pass-the-conductor system, using Johnson fare boxes and International double fare registers, so as to give a double check on the fares collected. The cars are being built by the regular shop forces under the supervision of K. B. Crawford, superintendent of tramways.

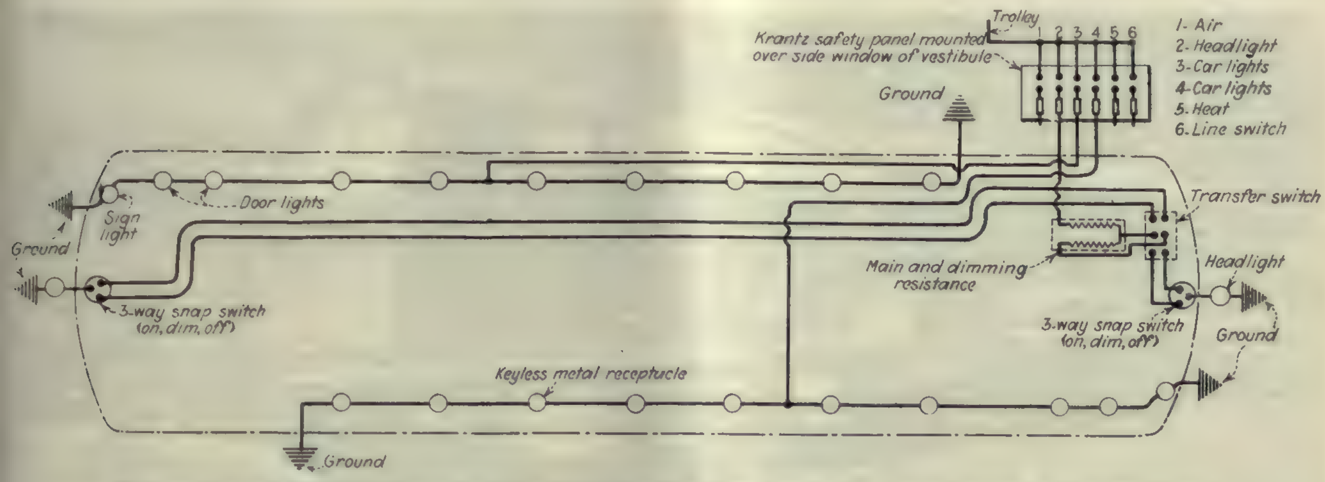
Light-Weight Cars for Connecticut Company

Double-Truck, One-Man Cars Weighing 26,000 Lb. Will Be Equipped with Four 25-Hp. Motors and Full Safety Devices

THE Connecticut Company has a line operating between the towns of Torrington and Winsted, Conn., a distance of approximately 12 miles, which at present is served by four heavy double-truck cars. The line, which serves both residential and manufacturing districts, has been losing some traffic recently due to the competition from jitneys. This fact led to a consideration of one-man cars, but because at certain periods of the day quite large crowds are handled it was decided that the standard safety car would not be the best equipment to use.



ELEVATION AND PLAN OF NEW 26,000-LB. ONE-MAN CARS BEING BUILT FOR THE CONNECTICUT COMPANY



WIRING DIAGRAM FOR NEW CONNECTICUT COMPANY CARS SHOWING LOCATION OF LINE SWITCH AND SAFETY PANEL

For this service a new car has been designed which in general appearance is an elongated safety car. The over-all length is 40 ft. 3 in. and the distance between corner posts is 29 ft. 6 in. This car, which will be operated by one man, is designed to seat fifty-two persons and is equipped with four Westinghouse 506-A-2 motors with Brill trucks. An elevation and a plan drawing of these cars are shown in in the accompanying illustrations.

Three of these cars are being built by the Wason Manufacturing Company and will be placed in operation in March or April to replace the four heavy cars now in service. They will weigh approximately 26,000 lb. each, and a great deal of the piping and fitting will be aluminum. The cars are being equipped with all features of the standard safety car and in addition will each be equipped with a pneumatically operated line switch beneath the car. All circuits such as lighting, heating, headlight, etc., will be controlled by a Krantz safety panel. A wiring diagram is shown.

At the time these new cars are placed in service the present power house, which is an isolated plant using reciprocating engines, will be abandoned. In its place two 200-kw. Westinghouse motor-generator sets are being installed and power will be purchased from the local power company.

It is confidently expected that these changes will place this line on a paying basis.

Equipment Maintenance Costs Compared

THE accompanying table gives a comparison of equipment maintenance cost and car mileage data for the Texas Electric Railway during the years 1914 to 1920 inclusive. This furnishes a good example of the upward trend of maintenance costs and at the same time is an example of very low costs in connection with equipment maintenance.

The figures in the accompanying table were taken from the auditor's statements and were supplied by Walter Silvus, superintendent of equipment for the Texas Electric Railway, Dallas, Tex.

Split Forged Steel Car Bolster Stronger and Lighter than Cast Type

THE accompanying illustration shows a forged steel split bolster which was made in the shops of the Portland Railway, Light & Power Company for freight car service. The bolster is made with a 1-in. web and ⅝-in. x 10-in. flange. The flange is electric-welded to the web and is reinforced at the side bearing with a ⅝-in. plate.

SPLIT TYPE CAR BOLSTER

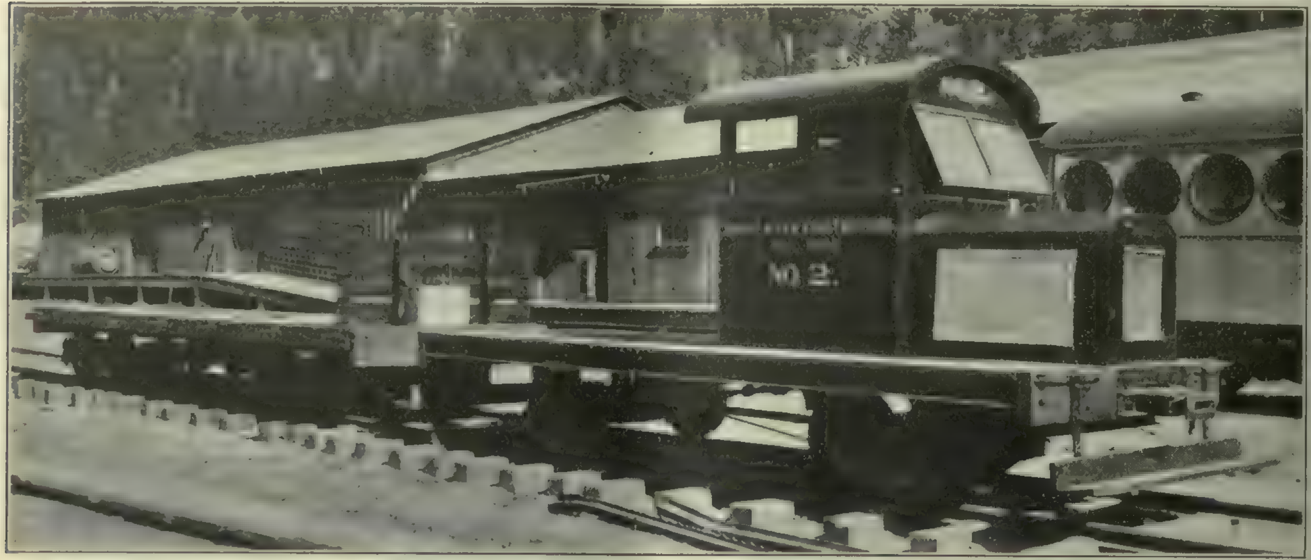
This type of construction provides a stronger and lighter bolster than the cast steel type and results in a saving of $65 per car.

COMPARISON OF EQUIPMENT EXPENSE AND CAR MILEAGE DATA, YEARS 1914 TO 1920 INCLUSIVE

ear	Total Amount Accounts 29 to 40	Total Amount Account 66	Number City Cars	Number Interurban Cars	Number Miscellaneous Cars	Miles of Track	Total Car-Miles	Cost per Car-Mile Total 29 to 40	Cost per Car-Mile Account 66
914	$89,739.39	$35,129.64	61	59	46	266.94	5,731,667	0.015	0.0061
915	55,125.96	28,632.20	64	64	37	266.94	5,239,429	0.0105	0.0054
916	55,184.88	28,812.54	60	63	38	266.94	5,214,920	0.0105	0.0054
917	70,561.05	29,414.69	57	79	38	279.38	5,576,207	0.0126	0.0052
918	89,766.42	38,664.52	58	82	38	279.39	5,778,946	0.0155	0.0066
919	121,403.33	46,667.27	66	82	40	280.66	5,930,479	0.0204	0.0078
920	149,489.20	56,115.52	72	84	40	280.14	6,108,394	0.0244	0 0091

Years 1914, 1915 and 1916 operated as Texas Traction Company and Southern Traction Company and above figures are a consolidation of the two companies.

Explanation:
Account 29 —Superintendence of equipment,
Account 31 —Substation expense,
Account 32 —Repairs to passenger and combination cars,
Account 33 —Repairs to freight and express cars,
Account 35 —Repairs to service cars,
Account 36A—Repairs to electrical equipment of passenger and combination cars,
Account 36B —Repairs to electrical equipment of freight and express cars,
Account 38 - Repairs to shop machinery,
Account 39 -Shop expenses,
Account 40 —Horses and vehicles,
Account 66 -Carhouse employees.



GASOLINE LOCOMOTIVE WITH FOUR-CYLINDER ENGINE. THE CAB ACCOMMODATES THE OPERATORS AND SEVERAL PASSENGERS. NOTICE THE FOOTBOARD AT EACH END

Gasoline Rail Equipment Developed for Seattle Power Project

Special Locomotives and Converted Motor Trucks Are Used in the Construction Work for the Skagit River Power Plants—Details of This Equipment Are Given

THE use of gasoline instead of steam locomotives is saving the city of Seattle from $50 to $75 a day. This on the 23-mile line from the terminal of the Great Northern Railroad at Rockport to a power site at Newhalem, the latter being about 100 miles northeast of Seattle. The maximum grade on the line is 1 per cent.

The freight equipment, shown in the accompanying photographs, consists of two gasoline locomotives, built by the Skagit Steel & Iron Works, Sedro Woolley, Wash. Rebuilt motor trucks are used to carry passengers.

The No. 2 locomotive, which is 18 x 7 ft. over all, has sufficient power to haul one standard box car loaded to full capacity of 80,000 lb. It travels 20 m.p.h. in high gear at normal engine speed. The framework of this locomotive is of steel with a wooden decking extending the entire length. A foot-board and spring drawhead are provided on both front and rear.

The locomotive is propelled by a four-cylinder, heavy-duty truck engine inclosed under a hood at the extreme front. Immediately back of the hood is a cab inclosing the control mechanism and large enough to accommodate the operator and several passengers.

The drive is through an inclosed multiple disk clutch and a four-speed selective-type transmission mounted on the frame.

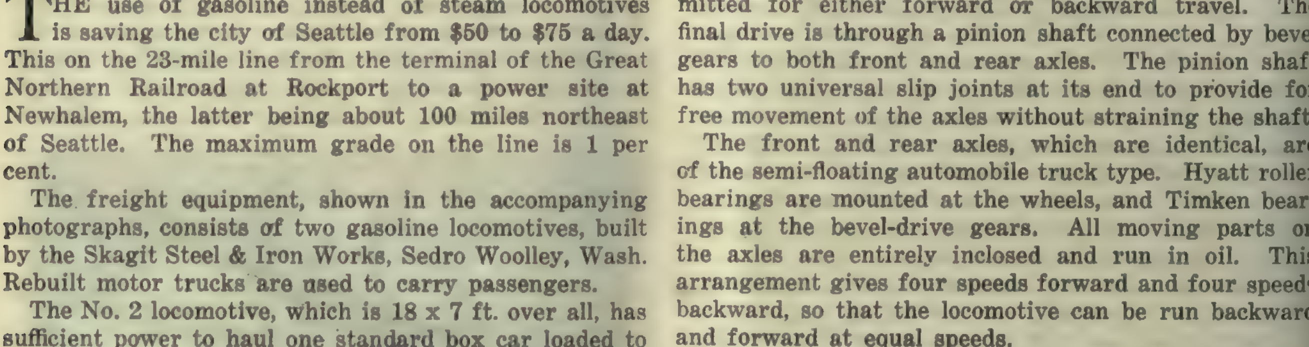
From the transmission a tubular propeller shaft with universal-joints on each end extends to the reverse-gear box on the rear axle. Here the power can be transmitted for either forward or backward travel. The final drive is through a pinion shaft connected by bevel gears to both front and rear axles. The pinion shaft has two universal slip joints at its end to provide for free movement of the axles without straining the shaft.

The front and rear axles, which are identical, are of the semi-floating automobile truck type. Hyatt roller bearings are mounted at the wheels, and Timken bearings at the bevel-drive gears. All moving parts on the axles are entirely inclosed and run in oil. This arrangement gives four speeds forward and four speeds backward, so that the locomotive can be run backward and forward at equal speeds.

Brakes with cast-iron shoes are mounted on each of the four wheels, being operated by a wheel in the cab. The semi-elliptic springs are large enough to take up the driving torque of the axles.

STANDARD AIR BRAKES ON HEAVIER EQUIPMENT

When heavier equipment was required for the construction work, the No. 3 locomotive was purchased. This will haul four loaded cars. It carries freight in a space extending full width and two-thirds of the



MOTOR TRUCKS CONVERTED TO RAIL SERVICE. THIS OUTFIT MAKES 25 M.P.H. IN CARRYING PASSENGERS ON THE CITY OF SEATTLE CONSTRUCTION RAILROAD length. At normal engine speed the No. 3 unit makes 18 m.p.h. in high, and 2 m.p.h. in low gear.

The frame of the No. 3 locomotive, which is steel beams and channels, is 40 x 9 ft. over all.

Power is furnished by a 90-hp. six-cylinder gasoline engine. The equipment includes an electric starter and generator, the latter providing current for electric lights.

The selective-type transmission has three speeds forward and reverse in direct drive, and a back gear which provides three low speeds for starting. The final drive is by worm gears to the extreme front and rear axles, the power being transmitted to the other axles by high-speed roller chains. All eight wheels on the two four-wheel trucks, therefore, are drivers, thus giving maximum traction.

The axles are mounted on ball bearings running in oil-tight housings. Worm gears and all transmission gears also run in oil.

The No. 3 locomotive is fitted with Westinghouse standard air-brake equipment, used for braking the locomotive itself or the cars that are hauled. Air-operated sanders are provided in both front and rear.

The passenger equipment consists of two rebuilt motor trucks. The power unit is a 2½-ton Signal truck, on which steel tires have been placed on the rear wheels and a pony truck on the front end. The standard foot-brake on the rear wheels has been retained, and what was formerly the steering wheel is now used to operate brakes on the pony truck. An additional gear has been placed on the transmission shaft, so that the same speed can be secured backward and forward. These converted trucks can run at 25 m.p.h., but usually take one and one-half hours for the 23 miles from Rockford to Newhalem on account of stops along the line.

The trailer unit is a Federal truck which during the war was in bus service between Seattle and Camp Lewis. The engine has been removed and the body set forward in a central position on the truck. While the differential is left in position it is not used, as power is not supplied to the rear axle.

LEFT, GASOLINE LOCOMOTIVE WITH FREIGHT COMPARTMENT AT REAR FOR WORK NOT SUFFICIENT TO JUSTIFY USE OF HEAVY STEAM LOCOMOTIVES. FRONT PLATFORM LEFT OPEN FOR USE IN ODD JOBS. BELL AND WHISTLE ARE MOUNTED OF ROOF. RIGHT, SIX-CYLINDER ENGINE INSTALLED IN OPERATOR'S COMPARTMENT FOR NO. 3 SKAGIT RIVER GASOLINE LOCOMOTIVE. DRIVING AND BRAKING MECHANISM ARE BROUGHT TOGETHER HERE

What's New from the Manufacturers

New Steel Developed for Drills

A STEEL of moderate cost and between carbon and high-speed steel in cutting ability has been produced recently by the Cleveland Twist Drill Company, Cleveland, Ohio, and is called Mezzo steel. This new steel is said to possess unusual qualities as the result of introducing a certain combination of alloys and giving a special heat treatment. It is well understood that a large number of shops are not equipped with sufficiently modern, powerful machines to get maximum results from high-speed drills. They are forced to reduce the speed of the drills, and if rigidity is lacking, also reduce the feed, resulting in much less work per hour. For maximum efficiency and strength, high-speed drills must be run fast enough to keep them fairly hot, and if the equipment will not allow this, a reduced speed nearly always results in breakage, which is costly. Costly breakage forces many shops with improper equipment to go back to carbon-steel tools.

TABLE OF COMPARATIVE DRILL TESTS

Size Drill	Material	R.P.M.	Feed per Revolution	Peripheral Speed, Ft. per Min.	Inches Drilled	
					Messo	Carbon
⅝	3 in. C. I.	356	0.031 in.	60	60*	5
⅝	4 in. M.S.	356	0.024 in.	60	32*	[illegible]
⅞	4 in. M.S.	294	0.024 in.	[illegible]	10[illegible]	[illegible]
⅞	4 in. M.S.	225	0.020 in.	50	32[illegible]	[illegible]
⅞	3 in. C.I.	294	0.020 in.	[illegible]	30*	1
15/16	4 in. M.S.	225	0.024 in.	55	[illegible]	[illegible]
15/16	3 in. C.I.	294	0.032 in.	75	30*	2[illegible]
1	4 in. M.S.	225	0.015 in.	[illegible]	21	1[illegible]
1	3 in. C.I.	225	0.020 in.	60	25	1
1¼	4 in. M.S.	180	0.016 in.	59	24	4
1⅜	4 in. M.S.	144	0.020 in.	51	12	1[illegible]
1⅝	4 in. M.S.	144	0.032 in.	61	30*	2[illegible]
2	4 in. M.S.	[illegible]	0.015 in.	55	32*	3[illegible]

Note—3 in. C.I. means a cast iron billet 3 in. thick. 4 in. M.S. means a machinery steel billet 4 in. thick. *Means test stopped, drill still in good condition.

It is evident that a great saving in expense can be made and maximum production obtained in the above cases by the use of a drill which sells at a moderate price and which will stand up under speeds and feeds considerably above those possible with carbon drills. Mezzo drills are recommended for drilling cast iron at greater speeds and feeds than can be used for carbon drills. In drilling machine steels and the softer alloy steels, Mezzo drills are said to be excellent, performing at much higher rates of speed and feed than those made of carbon steel. They are not, however, recommended for use on extremely hard materials. For this purpose high-speed drills still outclass anything developed and their comparatively high initial cost is more than offset by the greater production.

The accompanying table of data from Mezzo drill tests is said to represent good general practice and should be compared with an average peripheral speed for carbon drills of about 35 ft. per minute in cast iron or machinery steel, with 0.010 in. feed per revolution. It will be seen that the new drills produced holes at more than three or four times the normal rate of carbon drills. Mezzo drills are furnished in sizes from $\frac{3}{16}$ in. to 2 in. inclusive and are carried in stock for prompt deliveries in any standard size.

Variety Sanding and Polishing Machine

A VARIETY belt sander has been developed by the Oliver Machinery Company, Grand Rapids, Mich., designed for the rapid sanding and polishing of all kinds of small irregular shapes, edge work and flat surfaces; also for polishing metal surfaces. It can be used in wood-working and pattern shops, or wherever a finishing and polishing machine is required. Features which are claimed for the machine include rapid production, ease of setting up work and maximum convenience and safety to the operator in performing his duties.

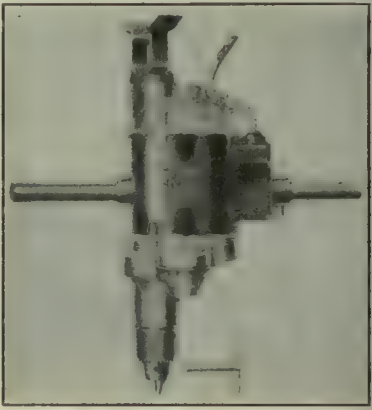
The main drive pulley is mounted on a countershaft, located on a substantial base, with a frame swinging about the center line of the countershaft and carrying a support arm. On this support arm are carried two clamp brackets, one of which supports the main idler pulley and the tension idler, the other supports the table and backing plate or any forms or flexible pans desired.

The machine will take belts up to 10 in. wide and 14 ft. long. The 10-in. x 12-in. edging table tilts to any angle up or down to 30 deg., can be adjusted in or out, and has drilled holes for attaching wood tops or forms. The backing plate is 10 in. wide and can be adjusted in and out to suitable tension on the belt; it has drilled holes for attaching flexible pads.

The main idler runs in ball bearings and is adjustable up or down the whole length of the idler arm to take care of various lengths of belts. The tension idler is of the ball-bearing type, fulcrums in the center line of the main idler and is balanced by weights to give the right tension to the belt. Both the main and tension idler pulleys are faced with leather.

The fork idler of this attachment, mounted on the machine in place of the regular table, is used for doing oval sanding, such as oval frames and all irregular shapes. The fork idler, rigid in construction, carries two aluminum idlers which run in ball bearings and are adjustable to the work. The height of the machine is 80 in. over all, and about 4 x 8 ft. of floor space is required. A 2-hp. motor, running at about 900 r.p.m., is required when directly connected to the lower drive pulley.

New Type Electric Drill



ELECTRIC MOTOR DRILL

THE Hisey-Wolf Machine Company, Cincinnati, Ohio, is marketing a new type of motor drill for operation on either direct or alternating-current circuits. Some special features include ball bearings on all revolving spindles and special design of the detailed parts of the motor in order to give a rugged construction. Forced ventilation is used and the vent openings are so placed that the incoming air must pass over the commutator and brushes before being drawn through the motor and expelled. These are supplied in three types of 775, 800 and 840 r.p.m. with weights of 43, 40 and 34 lb. respectively.

Electrically Driven Band Saw

ELECTRICALLY OPERATED 16-IN. BAND SAW

THE accompanying illustration shows a new 16-in. band saw which is being introduced by J. D. Wallace & Company, Chicago, Ill. This new machine has disk steel wheels, which insure durability and accuracy, and ball bearings are also provided throughout. A totally inclosed electric motor is built into the machine and directly connected to the lower wheel by a fabroil gear and steel pinion. These run in oil to insure lubrication and quiet running. The centrifugal force throws the oil into the bearings and keeps them well lubricated.

The table is a flattened and ground steel plate 19 in. by 21 in. It is mounted on a large rocker bearing, which can be adjusted to any angle from 45 deg. to minus 5 deg. An indicator is provided to show the angle at which the table is tilted. The table is mounted so that it can be readily removed. All adjustments are controlled by hand wheels or thumb screws. The height of this machine is 5 ft. 9 in. over all; the table is 42 in. from the floor and the floor space required is 15 x 29 in. A ½-hp. General Electric motor is used which has a speed of 1,750 revolutions per minute. The saw runs 3,150 ft. per minute.

The blades used are especially made for this machine. They are of special steel properly treated and cut so as to give the greatest number of producing hours on this size wheel.

How Can the New York Transit Problem Be Solved?*

Transit Facilities in New York City Have Lagged Behind Its Needs—Only the Municipality Can Afford to Extend Transportation to Any Extent Into Undeveloped Territory—Operation Should Be Under Private Direction—Universal Transfer Privileges Are Desirable

By DANIEL L. TURNER
Consulting Engineer to the Transit Commission of New York City

IN THE early part of the nineteenth century, foot and horse locomotion was the only means at hand. The distance that the people would live away from the business center was a matter of the time they were willing to spend in travel to their occupations in the morning and to their homes at night. In the past, this time limit has appeared to be about one hour in and one hour out. This meant 3 or 4 miles out for the foot travelers, and 6 or 8 miles for the horse travelers. The workers would walk and the employers would ride. Such old towns, therefore, would contain as large a population as could be cared for within an area circumscribed by a radius of from 6 to 8 miles.

With the coming of the steam railroad, the population of the towns soon increased and congestion was felt within the 3 to 4-mile limit. Then cheap horse transit became necessary. The bus first, and then the horse-car were evolved. The New York & Harlem Railroad, a horse car line operated in Fourth Avenue in New York City in 1832, was the first street railway in the world. The buses and horse cars brought the then existing suburbs within the one-hour ride. London now took the lead and the first urban rapid transit line in the world, an underground railroad, was built in London in 1863. New York in 1868 operated the first elevated railroad, built along Greenwich Street from the Battery to Dey Street. In San Francisco, in 1873, the first cable surface road was placed in service. Then, a few years later, near Berlin in 1881, the first electric operation came.

The electric roads quickly superseded all other forms of surface travel and extended the city transit limit from 10 to 12 miles from the business center. In 1904 the first rapid transit express line was placed in operation in New York.

Fifty years ago our transit problem was just the same as it is now. It only differed in intensity. Then the population in the area now included within the city was about 1,500,000. Now it is nearly 6,000,000—four times as great. At that time the total fare passengers only amounted to about 150,000,000. The fare passengers have now increased to nearly 3,500,000,000. That is to say, the passenger traffic has multiplied nearly seventeen times. But before each added transit line has been ready for use the traffic growth has more than ancitipated it. When conditions have become unendurable, some effort has been made to meet the situation. But each time, with few exceptions (a notable exception was the dual contracts) the aim seems to have been to secure immediate relief rather than lasting benefit, and then to shift the problem on to those who were to come afterward.

Our cities are planned today very nearly as 100 years ago. The old man-and-horse towns of a century ago needed for circulating purposes only roadways along which men and horses could travel, and these roadways criss-crossed the town in all directions. When street railway transit superseded foot transit, the street railway system rather than the street system should have been accepted as the principal circulating medium of the town, and the town should have been planned and constructed accordingly. But this was never done and is not being done even now. The town planner in the old days failed to recognize this principle—and even today, in our time, those responsible for the planning and development of our cities have not grasped the full significance of this principle and its importance with respect to comfort, health, happiness and economic welfare of the community.

HOW PRIVATE OWNERSHIP DELAYED DEVELOPMENT

Private ownership and operation of city transit facilities because of the principles underlying it has retarded the proper development of our modern cities. To understand the reason for this, let us begin at the beginning once more. When the 3 or 4-mile town limit was passed, the essential thing was not done. The town authorities left the construction of the street car system to private interests. The natural course for a business man is to develop his property so as to produce as quick a return as possible, and these old horse car owners selected the route which seemed to them to offer the best prospect of early revenue on the investment. Of course, as many residents as could moved their residences so as to be near the route. They were attracted, just as a magnet attracts. What was the result? Congestion of course! Rush-hour congestion! then housing congestion!

What happened next?

Other lines were constructed, of course. Did their owners seek another part of the city for a route and endeavor to develop more of the city? Why should they? Why take the time to develop new territory when good business was immediately in sight? The next line was located as near the first one as practicable. And so history repeated itself from those old days until now. Meanwhile, there was plenty of vacant space available for development and plenty of population to fill it comfortably. But instead of spreading out, the population started to spread up. Instead of living and working in one plane, we are now doing so in forty planes, and the limit is not yet.

Transit facilities should be based on the area of the city served—not on the traffic immediately in sight. Only by utilizing this principle as the guiding policy of future transit development can the existing transit conditions be cured.

Expanding the transit system in this manner, of course, does not mean that there should be street railway lines in every street. But it does mean that a new lattice-like transit system should be superimposed upon all of the old and new street systems on an enlarged scale. Instead of through every street, the railway tracks should be located a number of streets apart in each direction, depending upon the character of the transit being considered.

If the area basis of developing city transit had been followed from the beginning, many of the most objectionable features of city life would not exist today. Everybody would be more comfortable, healthier and happier. Our people would not be living so much in layers. Instead, most people would be in their own homes spread out through the open country, thus making living conditions more ideal. The rush-hour congestion—our greatest transit problem—would not exist as we now experience it. There would be heavy movements of traffic in all directions to and from the business center, but they would not be concentrated movements along a few lines of travel. Therefore, the rush hours, as we now know them, would not exist at all. The commission proposes to expand the application of this principle to include surface facilities as well as rapid transit lines. Of course this means municipal ownership with proper planning.

The great trunk rapid transit lines

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*Abstract of paper read before the New York section of the American Society of Civil Engineers on Feb. 15, 1922.

are the chief arteries of travel. The surface lines first, then the buses, then the streets, in the order of their relative importance, are only the lesser arteries of the system. All of these traffic agencies must be utilized, and to be utilized most effectively they must be regulated and controlled by the community, just as the streets are now regulated and controlled by the community.

In preparing for the extension of a city, the streets are laid out, graded, sewered, water supplied, and paved beforehand in order to induce the population to follow. It is even more important that we should not wait for the population to accumulate before constructing the necessary transit lines. Yet, this is the policy the operating companies would have us adopt in the case of transit lines when they own and control them. They are averse to developing new territory. The traffic returns from such territory would be too lean. They are after the fat only. They contend that municipal transportation should not be furnished to a community until there is a population ready to be served. They insist that it is better to follow old lines of travel than to create new ones. They would parallel already congested lines by new facilities, instead of deflecting the new facilities into undeveloped territory.

From the viewpoint of the operating companies, and considered as a business proposition, the correctness of all of these principles cannot be disputed. Such principles have served as the guiding policy in the past, and have produced the conditions which now prevail. If the same principles are to control in the future, then strap-hanger service will be the public's portion for all time. The rapid transit line, therefore, at the outset would have a larger traffic return. There would be fewer lean years to wait for the territory to develop.

In journeying from home to work, one must utilize at least two, and frequently three means of travel. First, of course, he must use the street. He may then use a rapid transit line or surface line or bus to his destination, or he may use a combination of two or more. Of course he pays no fare for the use of the street. He ought to pay only one fare for the service on such part of the transit system that he is required to use, whether bus, surface line, or rapid transit line, separately or in combination. This end can only be attained under a system of universal transfer, and under a system which utilizes all of the facilities coordinated under a general plan. A single operating company can best perform this service. Therefore, monopoly of operation is desirable.

As between municipal operation and private operation, there can only be one answer, as I can see it. The public cannot perform any function as cheaply as a private company can do so. Public employees cannot be held under the same strict discipline that can be exercised over private employees. Under present political conditions, it would be impossible to keep municipal operation free from political dictation and domination. At the present state of civic development, municipal operation to me is unthinkable. The only alternative is private operation under public control, a control aimed to secure a convenient, adequate, and safe service for all. In so far as supplying the facilities is concerned, municipal ownership would insure their construction and extension in the manner which would best serve the community.

The different boroughs of the city are not all equally desirable climatically, physically, or socially; so that everything else being equal, they cannot be expected to develop exactly alike. But the city's transit facilities should furnish the same standard of service to them all. At least there should be no discrimination in this respect. Every borough should be permitted and assured the full measure of development which its own particular circumstances make possible.

In developing a plan of municipal ownership and private operation, at first several operators of the transit lines may be necessary, but ultimately a single company should exercise all of the operating functions. An operating monopoly by a private company under public control will insure the same character of service to the whole city at a uniform rate of fare, will make possible universal transfers, will provide every citizen with transportation from his home to his work for the same fare, will enable the passenger to traverse the city from the circumference to the center for one fare, and will reduce operating costs to the minimum and therefore will permit the least fare.

INCREASES IN NEW YORK TRAFFIC AND NEED FOR NEW LINES

The traffic on the surface and rapid transit lines of New York City has nearly doubled in the past fifteen years. In 1906, the revenue passenger traffic on all lines was 1,251,000,000. In 1921, it had increased to nearly 2½ billion passengers, or had nearly doubled. In 1870, fifty years ago, there were 103 revenue passenger rides per capita per year. In 1921, there were 437. In fifty years the riding per capita has increased four and a quarter times.

Considering rapid transit traffic alone, in 1913, the year the dual contracts were signed, the rapid transit lines in Manhattan, Brooklyn and the Bronx, subway and elevated lines together, exclusive of the Hudson & Manhattan, carried 810,000,000 fare passengers. In 1921, these same rapid transit lines, together with the new lines which had been placed in operation, carried about 1,418,000,000 passengers during the year. This means that the increase in rapid transit traffic alone has been 75 per cent in nine years. The foregoing figures are sufficient to indicate the enormity of the increase for which municipal transportation must be provided if the development and the prosperity of the city are not to be held back.

A continuous subway building program is necessary if the city is to catch up with and keep up with its tremendous transit needs. The city has been building subways for twenty-one years, but intermittently. Up to the present time, the Interborough company, the first operating company to begin to operate city-owned subways, has expended $178,000,000 for construction and equipment. The Brooklyn company, which came into the plan later, has expended $78,000,000 for the same purposes. The city alone has spent for construction $295,000,000. This makes a total expenditure during the past twenty-one years of $551,000,000. Before the dual system is finished, approximately another $50,000,000 will have to be spent by the city and companies, so that before the dual system is finished, the city and the companies must spend over $600,000,000. This vast sum would almost construct and equip three two-track steam railroads across the continent from the Atlantic to the Pacific.

The dual system contracts were nine years too late in getting started. The war has delayed their completion, so that now the construction program is fully ten years behind the transit requirements. The time has now arrived when we must look ahead again. A comprehensive plan for the enlargement of the rapid transit system must be developed. The work of carrying out such a plan must be begun immediately and proceeded with gradually and continuously if the transit facilities are in any degree to keep pace with the tremendous traffic increase.

The money for such a program may be obtained just as it has been obtained in the past—that is, by utilizing the credit of the city and borrowing such amounts as may be necessary, not to exceed the city's debt limit. The only difference between what has occurred in the past and what is proposed for the future is that the city's credit should be utilized not only to secure rapid transit facilities, but also to secure bus and surface car facilities, whenever the transit program requires it.

The debt limit of the city is fixed by law at not greater than 10 per cent of the total assessed value of the real property in the city. All of the money that the city has expended on its subway facilities to date, aggregating nearly $300,000,000, has been obtained in this way. There is now charged against the debt limit the $233,000,000 expended for new subways under the dual contracts. The commission plan provides that the interest and amortization on this sum will be paid out of the pooled receipts of the new system, thus removing the charge against the debt limit, and thus making this vast sum available for new subways.

In the future, some other means of enabling the city to supply the necessary funds may be necessary, but whatever plan may be adopted, the cost of municipal transit must be paid for, and the answer is that the city must find the necessary money.

In 1920, during the maximum three hours in one direction, from 7 to 10 a.m. workward, or from 4 to 7 p.m. homeward, the total commuter travel into lower Manhattan, including steam railroad, ferry and tunnel commuters, aggregated approximately 336,000 passengers. This traffic is growing rapidly. During the last ten years it has increased about 117 per cent at the Grand Central Terminal. During nine years, the Long Island commuter traffic has increased 141 per cent at Flatbush and 275 per cent at the Pennsylvania Station. The commuters on the New Jersey Central, Lackawanna and Erie roads have increased approximately 40 per cent during the last ten years. These figures emphasize the fact that the commuter traffic has become a very great factor in our rapid transit problem. The growth of the traffic is so stupendous that the consequences will be very serious if immediate steps are not taken to deal adequately with it. A Metropolitan Transit Plan, separate and distinct from the Metropolitan transit system, should be devised for this purpose.

MR. TURNER'S SUMMARY

The public welfare demands that more street railways must be provided in order that better service may be furnished during the rush hours and during all hours of the day. For social reasons it is desirable that transit facilities should be extended into new territory as early as possible. For the same reasons, new lines of travel should be developed instead of following old ones. City transit should precede the population; it should not follow the population. If all of these principles are followed, then:

Congestion of population will be dissipated, not intensified;

The population will be distributed to the outermost limits of the city, not confined to population centers like the lower East Side of Manhattan.

The outlying sections of the city will be developed and enhanced in value, not depreciated.

The city's growth will be promoted, not retarded.

Universal transfer privileges can be established so that the passengers may ride between their homes and business for a single fare; and

The intolerable rush hour conditions will be eliminated. Every passenger will be able to travel to business in the morning and home at night, comfortably and decently.

In other words, if the transit plan is based upon the area served instead of upon the traffic in sight;

If municipal ownership is substituted for private ownership;

If operation by a private company under public control prevails instead of municipal operation, as proposed, or

In short, if city transit is developed in accordance with all of the foregoing principles, instead of those which have prevailed in the past;

then the New York City transit problem will be solved.

The Commission Plan proposes to follow such principles.

Discussion on Mr. Turner's Paper

The chairman of the session at which Mr. Turner's paper was presented was Nelson P. Lewis, consulting engineer Board of Estimate, city of New York, and until recently and for many years chief engineer of the board. Mr. Lewis explained that invitations to discuss the paper had been sent to representatives of all of the principal traction companies in the city, but each had expressed an unwillingness to give his views. He then introduced as the first speaker in the discussion Edward A. Roberts of the Beeler organization, and also connected with the engineering department of the commission.

Mr. Roberts explained that his remarks would be confined to the surface lines. Some people seem to think that they are an insignificant part of the transportation system of the city and they can be scrapped without great loss, but for every three passengers on the rapid transit lines there are more than two passengers on the surface lines. At one time the companies were in prosperous condition, but now the contrary is the case. Their present problem is in two parts, namely, to attract more passengers and to reduce expenses. These two objects are by no means incompatible. Rerouting is the first thing to be attacked in a case of this kind. Districts are constantly changing owing to business and social conditions, and to obtain the best results car routes should be frequently revised. Another important matter is the introduction of modern equipment, and the speaker described the beneficial results obtained on many railway systems through the operation of safety cars. Other means of obtaining the desired results are regularity of service, loading platforms, skip-stops, which the speaker said can better be designated as proper spacing of stops, and revision of time tables to reduce waste time. He then compared operation in New York and Boston as follows: Boston: Fare 10 cents, with 20 per cent of the passengers paying 5 cents; earnings per car-mile, 66 cents. New York: Fare 5 cents, earnings per car-mile, 68 cents. Boston: Revenue car-miles per car-hour, more than 10; earnings per car-hour, $6.62. New York: Revenue car-miles per car-hour, less than 7; earnings per car-hour, $4.71.

Mr. Roberts also pointed out that if it was possible to increase the schedule speed in New York by the moderate amount of only 1 m.p.h., which even then would leave New York considerably behind other large cities in point of speed, 13,000,000 car-miles could be added at practically no additional operating expense or capital outlay. These added car-miles would provide facilities for 125,000,000 passengers, or more than a 5-cent increase.

Frank J. Sprague, the next speaker, said that thirty years ago he visualized the needs of New York transit and laid down the underlying principles in the daily papers and in addresses before technical societies. His plan contemplated two four-track lines north and south each side of the city with a cross-town line extending through Williamsburg, Brooklyn and New York to Jersey City and Hoboken, crossing the north and south lines at a different level. The original Interborough line was built like a snake and when the logical H was formed the Forty-second Street shuttle with its illogical engineering features was the result. He said that in 1890 and 1891 the rapid transit commissioners did not know whether they wanted an underground or elevated railway, and an effort was made by certain interests to secure the right to build a steam-operated elevated railway up Broadway. At that time the speaker said he offered to run trains with electric power at 40 m.p.h. if given the opportunity. Continuing, he said that traffic facilities in New York had too long been a means to an end in private operation, though perhaps this was a necessity. In future designs it is most important to have routes and tracks utilized to the limit. If the present subways were operated by electric locomotives or single motor cars at the head of the trains the capacity would be so limited that the city would have to invest more than $100,000,000 in additional subways to secure the same capacity. Multiple-unit operation has made the present capacity possible. Logically, a train should be made up of like units, because then a train would have the same speed characteristics as a single car. Brakes are applied to every wheel and why should not motors be also? It would be interesting to see what could be accomplished with every wheel equipped and with the greatest possible speed, particularly on the local tracks. Much thought has been given recently to schemes for reducing expenses by keeping the number of trains and attendants at a minimum, but except for studies by Mr. Turner, particularly on spreading office hours, there has been little investigation as to how the passenger carrying capacity of the rapid transit lines can be increased without increasing their trackage.

Mr. Sprague then declared that the suggestion for a universal transfer in Mr. Turner's paper, in his opinion, was not sound, as it would decrease the capacity of the system. People would ask for transfers to ride short distances when they could just as well walk, and walking would be better for them. The sound basis was for a man to pay for what he got.

General Lincoln C. Andrews, in charge of the working organization of the Transit Commission, then said that while the picture painted by Mr. Turner was good, he was more interested to know what could be done during the next five years, as it would take five years to build a subway. There was a crying need for a solution.

H. M. Brinckerhoff, of Parsons, Klapp, Brinckerhoff & Douglas, was the next speaker. He said that he had checked off with a "no" and "yes" the conclusions listed at the end of Mr. Turner's paper and had found more "nos" than "yes." He believed that Mr. Turner had treated the subject primarily on the basis of city development, but one must be on his guard against thinking that he can control city development by transit. Figures show that for a number of years the populations on the lower East Side and lower West Side of New York have changed very slightly in number and that the decrease in population in Manhattan has come from the central district. He thought that greater relief to these crowded tenement districts would come from sanitary measures than from transit changes. The present congestion in transit matters is more at the delivery end, and in developing new residential districts care must be taken that too many lines are not brought into the heart of the business district to increase the congestion already there. The speaker then referred to the experience in Chicago where some years ago elevated roads were built into the suburbs far in advance of the population. Now, Chicago has what might be known as the "twilight" district, just outside the business district, because people had moved from there to the more attractive residential districts outside. In referring to a paper which he had presented before the same section last year, Mr. Brinckerhoff said he had shown that the transit development in New York so far had been almost entirely north, east, and south. He hoped that the commission would see if it could not develop population more to the west. In conclusion he offered a defense of city planners who, he thought, were endeavoring to coordinate their work with that of adequate transit facilities.

T. K. Thomson said he thought the term "rush hour" was a misnomer because train and passenger movements at that time were slower than at other times.

John P. Fox pointed out that important office and business districts were being built up at various points along the rapid transit lines, citing the development of the Forty-second Street district as an example. He praised the idea of a four-track rapid transit line.

Internal Railway Motor Temperatures Control Capacity

In Paper Before Electrical Convention, Manufacturer's Engineer Outlined the Factors Which Determine Motor Heating and Suggested a Plan for Estimating Temperature Rise Under Operating Load

AT THE midwinter convention of the American Institute of Electrical Engineers, held during the past week in New York City, G. E. Luke, Westinghouse Electric & Manufacturing Company, read a paper entitled "Heating of Railway Motors in Service and on Test-Floor Runs." The purpose of the paper was to explain an original method for estimating the temperature rise in a motor when the continuous rating is known. On account of space limitations this method cannot be reproduced here; some of the facts cited by the author will be given, however, with a view to outlining the phenomena involved in motor heating. The substance of the paper, aside from the method, is given below.

WHY MOTOR SELECTION IS COMPLICATED

The selection of a proper motor for a particular railway service is without doubt one of the most difficult problems in motor application. The motor is subject to daily rush-hour loads; to possible heavy peak loads due to a steep track grade. In addition, it is called upon to deliver abnormal overloads resulting from conditions such as holiday crowds, trailer operation, snow or the necessity of pulling in a disabled car, and these conditions are apt to be accompanied by a low line voltage.

Railway motor failures may be classed as mechanical and electrical. Many of the electrical failures are due either to poor commutation and flashing or to excessive temperatures. In the modern commutating-pole motor mechanical failures, and those electrical ones which are caused by poor commutation, have been greatly reduced; however, the possibility of breakdown due to high operating temperatures is still present. The modern high-speed, ventilated, commutating-pole motor will deliver a much greater output per pound of motor than the early types of railway motors. This means of course that the motor's capacity for the storage of heat on short-time overloads has been reduced and has resulted in making the peak-load temperatures the predominating factor in some railway motor applications.

The adoption of simple tests which would be a criterion of a motor's performance in any railway service has been recognized as impractical. With such intermittent loads the best general method of rating should be based upon the motor's overload or thermal capacity and upon its continuous rating. Thus the standards of the American Institute of Electrical Engineers say that the nominal rating of a railway motor is that output which the motor will develop for one hour with a temperature rise by thermometer at the end of the run or not over 90 deg. C. on the commutator, and 75 deg. C. at any other normally accessible part. With this short-time run most of the heat loss is stored up in the motor.

Thus the one-hour rating is to a certain degree a measure of thermal capacity and continuous rating is a measure of ability to dissipate heat.

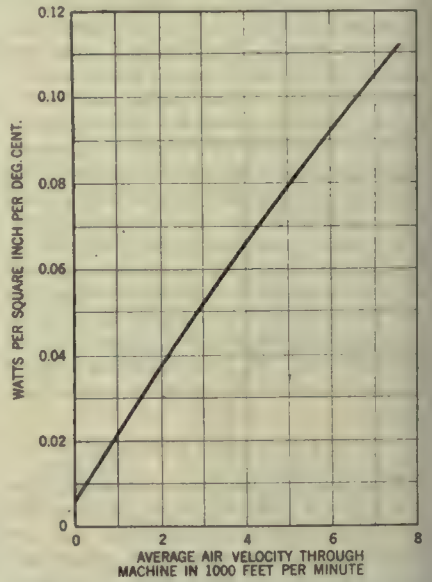

FIG. 1—CURVE SHOWING SURFACE HEAT DISSIPATION FROM RAILWAY MOTORS IN WATTS PER SQUARE INCH OF SURFACE PER DEGREE DIFFERENCE BETWEEN SURFACE AND AIR TEMPERATURE

With regard to ventilation there are three general classes of railway motors, namely, totally inclosed, self-ventilated and separately ventilated motors. The Institute rules define a "totally in-

DISTRIBUTION AND DISPOSAL OF LOSSES IN RAILWAY MOTORS

Type of Ventilation	Inclosed		Self-Ventilated				Separate Vent*	
Rating —Time	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.
Volts	600	450	600	450	600	450	600	450
Hp.	60	....	65	....	25	....	200	
Amperes	88	36	95	60	37	35	280	220
Rev. per min	700	827	700	638	1,225	950	670	550
Weight of bare motor, pound	2,350	....	2,350	....	870	....	5,200	
Weight armature, pound	615	....	615	....	225	....	1,700	..
Armature watts loss:								
Armature copper	1,800	301	2,100	840	820	733	3,980	2,450
Armature iron and stray power	1,170	560	1,170	620	780	500	3,250	2,500
One-half friction and windage	300	400	325	280	220	155	900	700
Brush loss	264	108	285	180	111	105	840	660
Total armature loss	3,534	1,369	3,880	1,920	1,931	1,493	8,970	5,310
Field copper loss	1,825	306	2,360	950	650	580	4,690	2,900
One-half friction and windage	300	400	325	280	220	155	900	700
Total motor loss	5,659	2,075	6,565	3,150	2,801	2,228	14,560	8,910
Per cent copper loss	64.0	29.2	67.9	56.8	52.5	59.0	59.5	60.0
Armature loss per cent of total	62.3	66.0	59.1	61.0	69.0	67.0	61.6	59.5
Watts loss lb. of motor	2.41	0.88	2.79	1.34	3.22	2.56	2.80	1.71
Armature loss lb. of armature	5.75	2.22	6.31	3.12	8.68	6.65	5.28	3.13
Armature copper loss/lb. copper	26.5	4.4	30.9	12.3	36.4	32.6	14.7	9.1
Field copper loss/lb. copper	7.1	1.9	9.1	3.7	9.1	8.1	8.7	5.4
Disposal of losses:								
Per cent absorbed	81.4	0	81.9	0	57.5	0	69.0	0
Per cent dissipated from frame	10.8	100	4.6	62.0	12.5	45.0	4.9	14.3
Per cent carried away by the ventilation air through motor	7.8	0	13.5	38.0	30.0	55.0	26.1	85.7

*Separate ventilation on the continuous rating only.

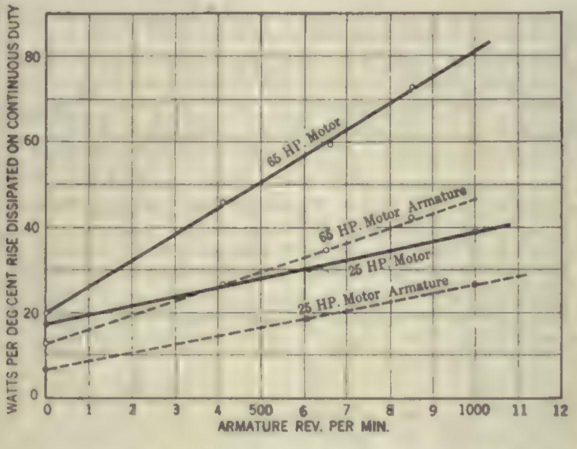

FIG. 2—MOTOR HEAT LOSS IN WATTS PER DEGREE RISE DISSIPATED AT VARIOUS SPEEDS AT THE CONTINUOUS RATINGS FOR THE MOTOR AND MOTOR ARMATURE

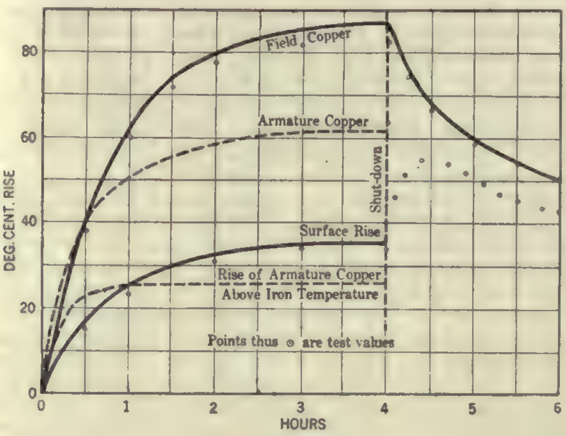

FIG. 3—HEATING CURVE OF 75-HP., 600-VOLT, DIRECT-CURRENT RAILWAY MOTOR, WITH FORCED VENTILATION. LOAD, 90 AMP. CURVES CALCULATED

closed" motor as one so inclosed as to prevent circulation of air between the inside and the outside of the case, but not sufficiently to be termed "airtight." A "self-ventilated" machine is one in which the ventilating air is circulated through the machine by a fan, blower or centrifugal device integral with the machine. A "separately ventilated" machine has its ventilating air supplied by an independent fan or blower external to the machine.

ONE-HOUR RATING IS PURELY ARBITRARY

The accompanying table gives the distribution of losses on four typical types of motors at the one-hour and the continuous rating. This nominal rating is purely an arbitrary one. As previously mentioned, the rating is intended to be a standard of measurement of a motor's thermal capacity. The requirement for this is that no heat loss shall be dissipated from the motor—that is, all of the losses must be stored in the motor masses. This condition is approximated in totally-inclosed machines where the heat loss from the external frame by radiation and convection rarely ever exceeds 10 per cent of the total loss.

In the early non-commutating-pole motors it was necessary to observe commutation carefully during this one-hour run, which required the removal of the commutator cover. This practice is still used in the modern motors. In fact, Rule 5202 of the standards of the A.I.E.E. says that the covers should be arranged to secure maximum ventilation without external blower.

Some of the self-ventilated motors will circulate as much as 50 per cent more air with all covers off than with covers on as in service. This has resulted in the nominal rating being dependent upon ventilation as well as the thermal capacity of the motor. The table shows that of the total loss, from 52.5 to 67.9 per cent is found in the armature. Since the weight of the armature is only about one-third of the total, its thermal capacity (ability to store heat) on short-time loads will be less than that of the motor as a unit. It results in an armature loss per pound of armature of 5.28 to 8.58 watts. The armature copper loss per pound of copper ranges from 14.7 to 36.4 watts. A loss of 4.5 watts per pound of armature will raise its temperature 75 deg. C. in one hour if all the loss is stored in the iron and copper. Hence in the 25-hp. high-speed motor at least 48 per cent of the total armature loss must be transferred elsewhere; with the larger motors this percentage is considerably reduced. A loss of 3.75 watts per pound of copper, if all stored in the metal, will raise its temperature 75 deg. C. in one hour. This means that toward the end of the one-hour run with this motor by far the greater part of the heat loss generated in the armature copper must be transferred to the iron or air and but little of that loss is stored.

On the one-hour run the motor losses are stored up in the iron and copper, carried away by the ventilating air through the motor and dissipated from the external frame by radiation and convection. The table referred to shows that of total loss about 81 per cent is stored in the motor parts for the first two motors, while for the last two more highly ventilated motors this percentage is 57.5 and 69. This shows that the one-hour rating is not a true indication of the motor's thermal capacity, since the percentage of the heat loss stored in the motor during this run is a function of the motor's ventilation.

On continuous duty all of the heat

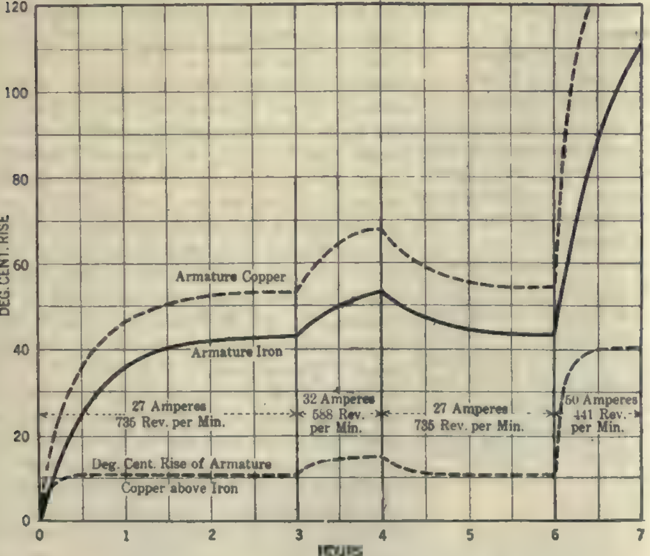

FIG. 4—HEATING CURVE OF ARMATURE IRON AND COPPER. 25-HP., 600-VOLT, DIRECT-CURRENT MOTOR

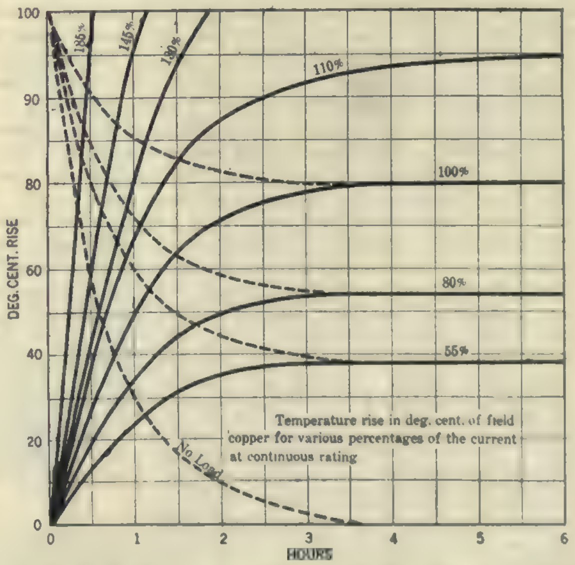

FIG. 5—HEATING AND COOLING CURVES. 75-HP., 600-VOLT, DIRECT-CURRENT RAILWAY MOTOR, SEPARATELY VENTILATED

losses in the motor must be transferred to the surrounding air, that is, this rating is not affected by the heat storage capacity of the motor. In a totally-inclosed motor the total losses are transferred to the frame and are then liberated by radiation and convection. The frame temperature rise is approximately proportional to the watts per square inch to be liberated. The heat dissipated from the frame is about 0.013 watt per square inch of surface per degree rise. This is an average value from many tests. The surface is taken as that of a solid cylinder whose over-all dimensions are equal to those of the motor. The actual effective surface is greater than this due to the roughness of the castings and the numerous irregular projections. This accounts for the high value of this constant, since the heat loss from a smooth surface due to natural convection and radiation is only about one-half of the above value. With a car speed of 10 m.p.h. the above constant is approximately doubled. The internal temperature drop from the armature to the frame is a function of the ventilating surface and the internal ventilation. It is evident that the external ventilation on the frame cannot effect this internal drop. The external frame rise on continuous duty averages about 60 per cent of the internal temperature rise when measured on the test floor by thermometers. The rating on an inclosed motor is limited by this low heat flow from the frame and by the temperature gradient necessary to cause the armature loss to be transmitted to the internal air and then from this air to the inner frame surface. For continuous-rated inclosed motors the weight per horsepower increases with the motor size. This may be seen, for example, by the fact that by doubling the motor's dimensions the external ventilating surface is increased to four times its first value while the weight is increased to eight times the original.

VENTILATED MOTORS ARE SUPERIOR

When air is circulated through a motor by either an internal or external fan the effect is twofold. It reduces the internal air temperature and for a given loss it decreases the temperature gradient between the ventilating surface and the internal air. It is possible to reduce this temperature drop to a very small value with separate ventilation; however, the internal insulation drop is still present. This temperature difference between the copper and the ventilating surface is the limitation to the degree of ventilation economically possible. Thus the table shows that the small 25-hp. self-ventilated motor on the continuous run can dissipate 2.56 watts per pound of motor while the heavy locomotive motor (insulated for 1,500 volts) with separate ventilation can get rid of only 1.71 watts on the basis of the same copper temperature rise. This is due to the large internal temperature drop in the windings and insulation of the larger motor which is independent of ventilation. The first two motors listed in the table give a comparison of continuous rating possible on a totally inclosed and a self-ventilated motor of the same weight. It shows that for the same internal temperature rise the inclosed motor can dissipate a loss of 2,075 watts while the self-ventilated motor can dissipate 3,150 watts. This difference will increase with the speed of the armature.

TEST DATA AND COMPUTATIONS SHOWING THERMAL CHARACTERISTICS

Mr. Luke used his method of calculation to illustrate the performance of typical motors. His principal diagrams are reproduced herewith. Commenting upon the graphs he said that Figs. 3 and 4 illustrate the fact that the armature copper on the average ventilated motor has comparatively little thermal capacity. It is seen that on loads of thirty minutes or more practically all of the copper loss is being transferred through the insulation. The thermometer measurements will not give this internal temperature, hence it is possible to find a safe temperature rise on a motor by thermometer although the motor may be dangerously hot in the inaccessible parts.

There is no doubt that from the standpoint of weight and cost the modern ventilated railway motor has an inherent advantage over the totally inclosed motor. It has been shown that since the ventilated motor can get rid of more heat losses than the same motor inclosed it is possible to rate the motor higher. This increases the continuous rating without materially increasing the one-hour or overload rating. The effect of ventilation is to decrease the surface temperature and to increase the gradient between the copper and the surface temperature. When a ventilated motor is applied to an intermittent cycle such as found in railway service, full advantage of the continuous rating cannot be taken since a margin in temperature is necessary in order to carry the heavy peak loads.

With the heavy inclosed motors the ratio of the hour to the continuous rating is high so that the application of such a motor on the basis of the average root-mean-square current is generally safe. The inherent thermal capacity of the motor will usually take care of the peak loads.

On the other hand the tendency of increasing the ventilation is to bring the continuous and the hour rating together. Hence the economical application of the modern high-speed ventilated motors must be made with more care, and the motors' performance from a thermal standpoint on such applications should be known.

For standard motors, heating and cooling curves such as shown in Fig. 5 can be calculated which will facilitate the proper application of these motors. The solid lines are the heating curves at various loads, while the dash lines are the cooling curves either with no-load or with definite loads. The time origin can be shifted to suit the initial temperature conditions.

CONCLUSIONS

1. The temperature limitation is the predominating factor in railway motor application. This limitation is found in the maximum "hot-spot" temperature at the peak loads.

2. The armature copper has relatively little thermal capacity which may result in high internal temperature gradients on short-time loads.

3. The ratio of the one-hour to the continuous rating approaches unity as the ventilation of the motor is increased.

4. The application of the ventilated motor on the basis of the average root-mean-square current to an intermittent duty is incorrect if the maximum internal temperature at the peak load is ignored.

5. It is the maximum internal temperature which first starts insulation failure. Hence motor ratings should be based upon this temperature and not upon the surface temperature as measured by thermometer.

6. There is no fixed relation connecting the internal maximum and the surface temperature as found by thermometers. This relation is affected by insulation thickness, degree of ventilation, duration and magnitude of load, together with size and accessibility of the motor windings.

Twenty-eight Member Bodies in A. E. S. C.

THE American Railway Association (Engineering Division) and the Association of American Steel Manufacturers have become member bodies of the American Engineering Standards Committee, bringing the total number of national organizations represented up to twenty-eight and of representatives up to fifty-two. The official representative of the A. R. A. is E. A. Frink of the Seaboard Airline Railway. The steel manufacturerers have not yet selected their representative.

American Welding Society Now Issuing Monthly Magazine

THE American Welding Society, New York, began last month the publication of its proceedings in the form of a monthly magazine. It thus returns to its practice when organized in 1919. Its earlier journal proved too expensive and but one number was issued. Then followed a period of five months during which there was no official organ, but in April, 1920, arrangements were made with the *Welding Engineer* whereby a part of each number of this monthly was given over to the society's proceedings. This arrangement was abandoned mainly because it was found difficult to separate the proceedings of the society from other printed matter appearing in the *Welding Engineer*. Thus the separate binding of the proceedings was impracticable. Further, the publication of news items of the society, of local sections, of committee activities, etc., was not provided for under the previous arrangement, and this was felt to be an additional reason for beginning the publication of a society organ. In addition to the publication of technical papers, the first issue of the *Proceedings* contains the report of society activities.

Hoover and Daugherty Agree on Proper Association Activities

Usefulness of Trade Associations Recognized and Limitations of Their Lawful Activities Defined—Publicity of Statistics the Answer—Of Interest to Electric Railways

IN CORRESPONDENCE made public on Thursday morning, it appears that Secretary Hoover and Attorney-General Daugherty have come to an informal agreement as to what trade associations may and may not do for their membership. This is a question which has been bothering the Department of Commerce for some time, in fact ever since Secretary Hoover took charge of the department. Mr. Hoover recognized immediately the advantages and desirabilities of trade associations, not only in the industries themselves but also in his work in trying to place the Department of Commerce in a position to assist American business. The many cases of litigation against various trade associations indicated a state of chaos or at least uncertainty as to what associations could and could not do under the law, and Mr. Hoover has been trying to outline certain principles so that, if associations function upon these principles, they would know their activities were sanctioned.

The correspondence consists of a letter dated Feb. 3 by Mr. Hoover to Attorney-General Daugherty, Mr. Daugherty's answer dated Feb. 8, and Mr. Hoover's reply dated Feb. 9. While much of the subject matter is concerned with those trade associations whose activities and statistics have to do with manufacturing industries—production, purchases, stocks, wages and costs and prices—parts of it are of interest to such associations as the American Electric Railway Association and the state and regional railway associations.

Leading up to his actual questions, Mr. Hoover says:

"The difficulty seems to lie in the determination of the means and methods that may be adopted to secure this necessary information. Little, if any, trouble is experienced in securing the admission that an individual may secure knowledge of these facts by any means that would not constitute an individual crime, and that he may use the information in such manner as his best judgment may tell him will bring him the greatest benefit.

"But when two individuals engaged in the same line of industry undertake to provide a means for securing facts necessary and essential to the economic and efficient conduct of their respective organizations, this form of endeavor seems to at once assume an aspect of difficulty that, in my judgment, is in no way justified by a proper consideration of the underlying necessities therefore.

"The individual sets up some form of instrumentality to secure the information without which, in the management of his business, he would be groping in the dark. His competitor across the street does the same thing, and each, securing his information in his own way, uses it as he sees fit, and the action of either one has not offended the majesty of the law. Yet, if the two seek to join the instrumentality each has used for information purposes and the same information is received through one instrumentality and the information given to each and it is used in the same way that it was before, it is suggested that the collective activity in the use of the consolidated instrumentality should not be permitted because of the greater ease and facility thereby afforded for the two individuals to make improper use of the information so acquired. In other words, the objection does not go to the instrumentality, but to the abuse of the information that may be secured through the collective means."

Later on Mr. Hoover says:

"Trade associations have been in existence for many years. The great majority are legitimate, both in form of organization and in activity. The minority, while lawfully organized under articles expressing lawful purposes, may engage in activities that are evidence of purpose contrary to and outside of the declared purposes in the articles of organization."

Mr. Hoover points out that there is propriety, generally speaking, in trade associations and that their lawful field of endeavor is large.

Of interest to railways is:

"Many of the trade associations securing and disseminating the statistical data mentioned have restricted the same to its membership, while others have undertaken to give the same to the public through the daily and the trade press concurrently with its members. The trade associations of the latter class are in the minority.

"Information lawfully secured regarding trade and economic conditions made public for the information of everyone cannot be harmful. Information secured solely for the benefit of members and of a character that puts the membership, by reason of the information, in a position of advantage as compared with the public without such information cannot be sanctioned by sound public policy. The act of securing the information and the use of it by the members of a particular organization may be perfectly lawful in itself, but it is my belief that good morals and a sense of fair dealing require the giving of the information secured in this collective manner to the public generally, to the end that all persons engaged in commercial transactions involving the information in question will be on an even footing.

* * * * * * *

"A majority of the associations collecting data of the nature indicated have distributed same only to members of the association, while others have undertaken to give the information to the public through the daily and trade papers. Publication of the information by these associations in the daily press has not been general, and its availability to the public has been largely through the medium of trade papers, and through the daily press to the extent that the latter may have been utilized. When published through trade papers this information should be released to members only after such publication.

Four of the ten direct questions from Mr. Hoover to Mr. Daugherty are also of interest:

"1. May a trade association provide for its members a standard or uniform system of cost accounting and recommend its use, provided that the costs so arrived at by the uniform method are not furnished by the members to each other or by the members of the association and by the lesser to the individual members?

"5. May a trade association arrange for the handling of the insurance of its members, including fire, industrial, indemnity, or group insurance. In other words, can the members of an industry, through the agency of a trade association, arrange for or place all of the insurance of the members?

"8. May a trade association, in cooperation with its members and acting for and in behalf of its members, handle all legislative questions that may affect the particular industry, regarding factories, trades, tariff, taxes, transportation, employers' liability and workmen's compensation, as well as the handling of rate litigation and railroad transportation questions?

"9. May a trade association, in cooperation with its members and acting for and in their behalf, undertake the promotion of closer relations between the particular industry and the federal and the state departments of government which may have administration of laws affecting the particular industry in any form?"

In connection with other questions he also refers to the question of wages.

Mr. Daugherty answers Mr. Hoover affirmatively except for two minor points. On one of these he says:

"With reference to the first paragraph, there is no apparent objection to a standard system of cost accounting, but I think associations should be warned to guard against uniform cost as to any item of expense."

The example he mentions is the uniform charge for stumpage made by some lumber associations.

The other point he raises has to do with the effect of uniform trademarks. He says:

"It seems to me therefore that it would be well to eliminate the latter clause in paragraph 6, to wit, 'and may the association engage in such form of promotion by furnishing trade labels, designs and trademarks for the use of its individual members?'"

In his letter dated Feb. 9 Secretary Hoover answers Mr. Daugherty's second objection by saying that his question referred not to a uniform trademark for all the products of the members of an association but rather to the association's activities in devising trademarks for various members of the association so that there would be no likelihood of confusion between trademarks, and ends by saying: "With this explanation I feel sure you will agree with me that our views on the matters presented are in complete accord."

Wisconsin Utilities to Meet

A JOINT meeting of the Wisconsin Electrical Association and the Wisconsin Gas Association will be held at the Hotel Pfister, Milwaukee, March 22, 23 and 24. One of the principal pieces of business that is expected to be transacted is the organization of a new association comprising all of the utilities of the state, probably under the name of Wisconsin Utilities Association. The program is to be divided up largely into group meetings in order to promote intimate discussion among men interested in the same subjects. The electric railway group will be conducted by W. G. Brooks, Westinghouse Electric and Manufacturing Company. Another group, on transmission line substation and distribution, will be conducted by George A. Mills, Eau Claire, Wis. There will also be group meetings on auditing, safety and sales work, in addition to joint programs on the morning and afternoon of March 23, and a joint banquet that evening. The program committee is actively at work in a special endeavor to make this one of the greatest conventions the associations have ever had.

Illinois Association Program

THE annual joint convention of the Illinois electric, electric railway and gas associations will be held at the Hotel Sherman, Chicago, March 15 and 16. There will be two joint sessions on Wednesday and Thursday mornings and a joint banquet on Wednesday evening, while the afternoon sessions will be devoted to the individual association meetings. At the Wednesday morning general session, in addition to the business meeting, there will be an address by B. J. Mullaney, director Illinois Committee on Public Utility Information. At the banquet that evening Senator William B. McKinley and Samuel Insull will be the speakers. On Thursday morning there will be an address by W. L. Goodwin, Society for Electrical Development, on "Some of Our Problems and How to Overcome Them." There will also be addresses by the three presidents of the national electric railway, electric and gas associations.

On Wednesday afternoon the electric railway section will have an individual session. These papers will be read:

"Possibilities of Through Billing and Routing of Freight Shipments," by Richard Breckenridge, Aurora, Elgin & Chicago Railroad. Discussion by W. H. Wylie, traffic manager Illinois Traction System, and C. L. Thompson, assistant to the president, Chicago, North Shore & Milwaukee Railway.

"Advertising the Electric Railway Service," by John J. Moran, Chicago, North Shore & Milwaukee Railway. Discussion by Luke Grant, Chicago Elevated Railroads, and J. T. Downey, National Railway Advertising Company.

"The Modern Electric Railway Franchise," by B. P. Alschuler, Aurora, Elgin & Chicago Railway, Aurora, Ill. Discussion by D. E. Parsons, general manager East St. Louis & Suburban Railway.

On Thursday afternoon the following papers will be presented before the electric railway section meeting:

"Design of a Satisfactory Safety Car for City and Interurban Service," by H. H. Adams, superintendent of equipment Chicago Surface Lines. Discussion by Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railway.

"Bus Lines as Aids to Electric Railway," by Earnest Farr, the Firestone Company, Akron, Ohio. Discussion by W. C. Sparks, vice-president Rockford & Interurban Railway, and W. G. Brooks, Westinghouse Electric & Manufacturing Company.

"Wood Preservation, Particularly as Applied to Preservation of Ties," by Mr. Waterman, Chicago, Burlington & Quincy Railroad. Discussion by Mr. Cameron, R. W. Hunt Company.

The electric section will have papers on Wednesday afternoon on investigation of the per capita energy consumption and on getting new business. On Thursday afternoon there will be papers on inductive interference, by John Leisenring, signal engineer, Illinois Traction System, on rural electric service and on development of higher power factor load.

American Engineering Standards Committee Active

Work on Wire and Cable Specifications Now Being Organized—Conference on Overhead Crossings Called for March 2 at Request of American Electric Railway Association

THE American Engineering Standards Committee has issued a statement regarding the status of a number of phases of its work.

As to the insulated wire and cable specifications, to which the American Electric Railway Association is a party, there are now sixteen groups of interests co-operating. Specific parts of the work have been assigned to twelve technical committees to which the following subjects, respectively, have been delegated: Definitions, copper conductors, stranding, rubber insulation, impregnated paper insulation, varnished cloth insulation, magnet wire, fibrous coverings, metallic coverings, standard make-ups, exports, and weatherproof, heat-resisting and similar material. W. A. Del Mar, chief engineer Habirshaw Electric Cable Company, is chairman of the sectional committee, and more than 130 engineers are participating in the work.

At the request of the American Electric Railway Association a conference is being called by the American Engineering Standards Committee to decide whether there shall be uniform specifications for the crossing of overhead wires, and to dispose if possible of certain differences of opinion in regard to those parts of the National Electrical Safety Code which deals with overhead lines. This conference will be held in New York City on March 2.

The following has been planned for the agenda of the conference:

1. Shall there be a set of national specifications for crossings between overhead electric wire lines and railways, and between different wire lines?

2. If so, what should be its relation on Part 2 of the National Electrical Safety Code, "Rules for the installation and maintenance of overhead and underground electrical supply and signal lines"?

3. Can disposition be made of the differences of opinion on Part 2 of the National Electrical Safety Code by (a) approving the present edition, (b) revising the present edition through a sectional committee of the American Engineering Standards Committee?

4. What procedure shall be recommended for carrying out the conclusions reached by the conference?

The American Electric Railway Association has summarized its reason for calling the conference as follows:

"For many years various associations and interests, either individually or jointly, have developed, and in many instances adopted, specifications intended to govern the construction of electric light, power, trolley, signal and communication lines across steam and electric railways.

"Recently the National Bureau of Standards has promulgated the National Electrical Safety Code, Part 2 of which applies to the general construction of overhead lines, including requirements at railroad crossings. The differences between the several specifications and codes has led to confusion.

"Realizing the desirability of having a standard that would be generally acceptable, the American Electric Railway Association as requested the American Engineering Standards Committee, by conference of the bodies interested, to determine the desirability of developing an 'American standard specification' which will include the requirements at railroad crossings."

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Mr. Henderson Answers the Witt Report

Superintendent of Seattle's Municipal Railway Disagrees With Expert Retained by City

D. W. Henderson, general superintendent of railways for the city of Seattle, Wash., has filed with the chairman of the city utilities committee his reply to the recent report of Peter Witt with respect to changes suggested by Mr. Witt in the methods of operation of the railway. Mr. Henderson is not in full agreement with Mr. Witt. Not by any means. One $800,000 saving which Mr. Witt said could be made by reductions in service, particularly in the business district, Mr. Henderson declared impracticable.

Another $800,000 which Mr. Witt declared could be saved by reducing the number of employees, Mr. Henderson said he found to be at best "greatly exaggerated," while virtually the only important item in which the superintendent agreed with the special investigator was in the need of 200 new cars, and the prediction that such a purchase would save about $100,000 a year for power.

Out of the Mr. Witt proposals, Mr. Henderson evolved the following outstanding recommendations, which he made with some additions of his own:

1. Purchase of 200 new cars, as proposed by Mr. Witt.
2. Rerouting of several north-end and hill car lines.
3. Use of one-man cars, though not to the extent proposed by Mr. Witt.
4. Construction of a car line to the Stadium.
5. Construction of a Cowen Park extension.

The new cars, Mr. Henderson said, might net a saving in the neighborhood of $100,000 on power and maintenance of equipment and track.

The reroutings he proposed would net another saving of $120,000, he said.

As to the one-man car plan, the superintendent said it is doubtful whether all lines should be operated on the one-man system, but there might possibly be a reduction of one-fourth of the present employees by adopting the method more fully. He added, however, that "we must not lose sight of the fact that it would be necessary to pay a one-man operator a higher wage than a two-man operator."

The Cowen Park extension, which Mr. Henderson has recommended several times, he said should be built along Fifteenth Avenue Northeast at the earliest possible opportunity, and as to the Stadium line, he said this should perhaps be constructed with aid from the general fund, or with the aid of the state or the university, as it would serve the general public and that institution.

On the first nine paragraphs of Mr. Witt's report, dealing largely with the history of the purchase of the street railway system, Mr. Henderson said he had no comment to make whatever.

On Mr. Witt's next five paragraphs, which criticized the operation of so many cars and lines over First, Second and Third Avenues, through the business district, Mr. Henderson said:

> At certain times of the day this is a fact, but during the peak hours of the day, from our observation, it is almost necessary to operate the number of cars which we are now operating on these different avenues, in order to take care of the amount of traffic on these streets.

Mr. Henderson said the revision of routes and schedules is kept constantly in mind in operating the railway, and that there are further changes in routings to be made from time to time which will benefit the public and effect economies in cost. Mr. Witt recommended certain reductions in the headway of cars on various lines, and reductions in the number of cars operated during off-peak hours. On this Mr. Henderson said it is true that the railway is now furnishing more seats during these hours than there are passengers, but that it would not do to operate the exact number of cars so there would be no vacant seats, as the people of Seattle voted to purchase the railway so that they could have better service, and they might have something to say regarding the kind of service which they should have.

Mr. Henderson did not concur in the recommendation by Mr. Witt that the through lines operating on First Avenue be split and the West Seattle cars turned back at Yesler Way. He said this would involve an extra cost in operation of forty-one car hours a day, at $2.55 a car hour, or $104.55 a day additional expense.

In addition, the superintendent said, it would greatly congest traffic around Yesler Way, and would work a hardship on passengers from the West Seattle district, inasmuch as the retail district has now moved to the vicinity of Pike and Pine Streets.

Trackless Trolley Plan Revived

Hopes for a trackless trolley between Dover and Harrisburg have again been revived. James I. Comely, Harrisburg, a representative of the Rossville & Dover Transit Company, asked the Borough Council, at Dover, that the ordinance giving the company the privilege of operating through Dover be extended for another year.

The ordinance was first drawn up five years ago and each succeeding year its extension had been asked. The Council granted the request. Mr. Comely stated that building operations had been held up because of the high price of material. He expressed the hope that the work may be started this summer.

Ceases to Urge Cincinnati Referendum on Service-at-Cost Ordinance

The citizens' committee, Cincinnati, Ohio, has discontinued its attempt to have a referendum on the amendment to the service-at-cost franchise ordinance which deferred collection of the 1922 franchise tax from the Cincinnati Traction Company. Suit filed by Eli G. Frankenstein, attorney for the committee to enjoin the amendment until the voters had passed on the question next August, also has been withdrawn. The following reasons are given by the committe for discontinuing its work on the referendum:

1. The ordinance provides that in determining the rate of fare that the $350,000 per annum franchise tax should not be reckoned.
2. This is done to hold down the rate of fare.
3. The city in reality waives nothing, since for three years it has not collected the franchise tax.
4. In order to earn this tax for the city (according to the 1918 ordinance) the Cincinnati Traction Company shall raise the rate of fare and thus exact the tax from the passenger.
5. As a tax producer for the city (the first paragraph of F, of Section 22, of the Ordinance No. 253—1918) it is a rank failure, and should be eliminated entirely, because of its discriminatory nature.
6. The committee therefore refuses to lend itself to an attempt to make an absurdity appear a reality.
7. Accordingly, Attorney Eli G. Frankenstein has agreed to withhold the suit in the Common Pleas Court against this ordinance.
8. This committee serves notice on the traction committee to be appointed by Mayor Carrel that it desires to have its representative appear before it, to discuss this and other phases of the trolley situation in order to find a solution of some of the traction problems and most particularly to eliminate the discriminatory tax feature.

Pittsburgh Traction Plan Heard Before Commission

Hearing on the proposed new franchise contract between the Philadelphia Company and the Pittsburgh Railways on the one hand and the city of Pittsburgh on the other was held recently before the Public Service Commission. The contract calls for the reorganization of the Pittsburgh Railways and the creation of a traction conference board in Pittsburgh. A. W. Robertson appeared in behalf of the railways and said that the traction conference was the only solution of the present condition of trolley administration in Pittsburgh.

The measure was opposed by the Allied Boards of Trade of Allegheny County through its representative, G. J. Schaefer. He believed that the city had suffered for twenty years the same conditions that the contract would perpetuate. He further thought that a merger of all the companies could be forced by the commission. Special Counsel Charles K. Robinson spoke in favor of the approval of the contract.

Chicago Empowered to Build Subways

Attorneys for the local transportation committee of the City Council of Chicago, Ill., gave an opinion on Feb. 9 to the effect that Chicago can build subways at once without additional legislation. Immediately upon hearing this some of the Aldermen proposed that a start on subway construction be made with the traction fund, which amounts to about $30,000,000. No action was taken, however, by the committee. Meanwhile negotiations are progressing before the committee for a new franchise for the surface lines and possibly a consolidation with the elevated railway companies. Notice was served on the Chicago Surface Lines that the fare case would be reopened by the Illinois Commerce Commission on Feb. 14.

Construction of Line to Effect Saving Suggested

A saving of $15,000 may be effected by the construction of a street car line down First Avenue South, in Seattle, Wash., and along East Marginal Way to South Park, according to a recent statement by Superintendent of Seattle Municipal Railways D. W. Henderson to the utilities committee of the City Council. Mr. Henderson stated that the city pays the Puget Sound Power & Light Company $19,385 a year for the use of its tracks by the South Park cars between First Avenue South at Spokane Street and Georgetown. In addition to this, the city would save $3,820 a year in operating expenses, making a possible total saving of $23,205, with a conservative estimate of $15,000.

The report was made when Georgetown residents protested against the rerouting of the South Park cars. The committee voted to hold up the protest of the residents for thirty days to give Mr. Henderson an opportunity to test the plan. He said the line could be ready within three weeks after arrival of the rails.

Houston Franchise Renewed for Sixteen Years

The franchise of the Houston (Tex.) Traction Company was extended sixteen years when the City Council passed finally the ordinance agreed upon by city officials and attorneys for the traction company as a compromise in the controversy over fares and service in general. Passage of this ordinance marks the end of a controversy that has been hard fought during the last two years, both in and out of the courts.

Under the compromise arrangement the traction company agrees to spend $1,200,000 in the next two years in Houston in extensions and betterments. W. E. Wood, general manager of the traction company, has gone to Boston to confer with officials of Stone & Webster in regard to raising the capital to be spent in carrying out the terms of the grant.

In keeping with its agreement the City Council also passed a companion ordinance which reduced fares in the city of Houston to 6¼ cents when paid in metal tokens or street car tickets issued by the traction company. These may be purchased in amounts up to $1. Fares paid in cash will be charged at the regular rate of 7 cents. Sale of the tickets at the reduced price will begin in thirty days from the passage of the ordinance.

Committee Formed to Rebuild Old Line

L. M. Hoefler, attorney, Claus Spreckels Building, San Francisco, Cal., heads a committee of San Mateo County capitalists and citizens which proposes to rebuild the old Ocean Shore Railroad at a cost of approximately $1,500,000, of which $200,000 has already been subscribed by San Mateo County citizens. New rails will be laid on the old track-bed. The line will be operated with gasoline motor cars for passenger traffic and steam cars for freight.

Horace Nelson of the Bank of Half Moon Bay, Half Moon Bay, Cal., has been elected chairman of the San Mateo County committee to gather additional funds. Estimates of costs, etc., for the proposed work have been prepared by Engineer Major Edwin W. Moore who is associated with Mr. Hoefler.

$4,000,000 Interurban Project Proposed

Preliminary steps were taken recently by officials of the Indianapolis & Cincinnati Traction Company, following the annual meeting of shareholders, for the construction of the proposed line from Rushville to Cincinnati. According to an announcement made by Charles L. Henry, president of the company, bids have been asked for grading the roadbed and laying the track and the matter will be definitely decided after all bids have been received. The route decided upon extends from Rushville, through Andersonville, Metamora, Brookville, Harrison, Ohio, and Cincinnati, a distance of 70 miles through a rich agricultural territory that is not served by steam railroad or traction.

It would cost approximately $4,000,000 to build the line. The company already has acquired the greater part of the right-of-way, and if construction costs are not prohibitive, it is believed that work on the extension will be started this spring.

Mr. Henry, in submitting his annual report to the stockholders, advocated an early start being made on the new work, expressing the belief that construction costs have about reached bottom. He expressed confidence in the general business outlook for this year and said that while last year's operations were disappointing, depression was general but all indications seemed to point to a better situation during the coming months of the year. The stockholders re-elected officers and directors.

California Governor Intervenes in Rate Case

Recently the California State Railroad Commission granted an increase in rates on the Pacific Electric Lines. About the same time a 50 per cent increase was granted the Southern California Telephone Company on rates applying in the city of Los Angeles. Vigorous protests against these increases have been entered with Governor William D. Stephens by various committees and associations.

In consequence of these protests the Governor has addressed a communication to the Railroad Commission, in which he asks that either the present new rates granted by the commission be suspended until the service conditions are bettered or that the cases be entirely reopened for a more extensive detailed investigation. The matter of service referred to has particular reference to poor telephone and gas service complained of in Los Angeles. The Governor states that he has been able to secure first-hand information regarding the effect of the rates granted the Pacific Electric Railway and the telephone company during his recent stay in Los Angeles. He cites the general feeling of electric line commuters and telephone subscribers and asks that their needs be fully considered:

The Governor's letter follows in part:

> I feel free to call these matters to your attention because you are an independent branch of our State government, over whose decisions and terms of office I have no control, and because these recent telephone and interurban rate increases, coming at a time when the public expected rates to fall with the general decline in prices, have resulted in a state of public bewilderment, which I fear may turn to public distrust of regulation.
>
> I am deeply concerned over the future regulation of public utilities in this State. The success of our form of government depends upon public understanding of, and public confidence in, the acts of public servants. I am confident that upon the evidence presented you formed the conclusions which you believed to be fair and just. And while I have not had the opportunity of examining the voluminous evidence submitted to the commission, I cannot ignore what seems to be the conviction of an overwhelming number of our citizens, that some other solution might have been possible in the cases referred to.
>
> For example, it is urged by the ratepayers, that "it is not just to burden lucrative lines with high rates in order to make up a 'fair return' upon lines barely paying operating costs," and that "gift property of a non-paying line should not be given its full present value when fixing rates for a profitably operated line." These and other contentions are being urged so seriously as to deserve further and fullest consideration.
>
> And may I not properly direct your attention to the statements that were made by officials of the Pacific Electric and other great public utility corporations at the hearings before the Legislature on the King tax bill, wherein said officials attempted to show that the physical values of their properties had not only not increased but in fact had greatly decreased. The King tax bill did not raise the tax rates of any interurban or street railway.
>
> I suggest to you, that this whole matter should be reopened, not merely to a rehearing on the evidence already offered, but that it should be gone into *de novo* and thrown open to all parties interested. And I suggest that, until it is known what is right and just, the increases should be suspended or revoked, if lawfully it can be done. If revocation is legally barred, then may I not suggest a corresponding monthly rebate to every subscriber until the service (telephone) rendered warrants an increase.

Mr. Mitten's Case

All Philadelphia Talking About Fight for Control Which Threatens Present Management

"Give 'em hell, pop!"

This is the admonition made in a letter addressed to President Thomas E. Mitten by a correspondent pledging support to the present management of the Philadelphia Rapid Transit Company in the fight against the five bolting directors. The expression of sentiment thus recorded may be lacking in elegance, but no one can quarrel with it on the ground that it lacks clearness and force. Moreover, it is a sentiment that is being reiterated everywhere, so that the controversy for control has become the one important topic of conversation in all Philadelphia.

LIVELY NEWSPAPER COMMENT

It certainly is no usual occurrence that prompted the editor of the Philadelphia *North American* in the issue of Feb. 7 to run an editorial set two columns wide the entire depth of the paper and concluded with the sentiment "the people of Philadelphia will stand a good deal, but they would not tolerate action that would throw the street railway back into chaos." Oh, yes, that was the *North American*, some will object. Wait a moment. If you are inclined to look askance at this quotation then consider the staid *Public Ledger*. It is "some" occasion when that paper raises its voice to warn against "the uncertain prospect of another policy and another viewpoint in dealing with the employees."

The "Give 'em hell" admonition is being posted in all the carhouses as a slogan. All Philadelphia is taking it up. Of course it will be votes and not a slogan that will win at the coming election, but in all electric railway history there never was a case in which similar questions were presented for settlement.

A NEW PHRASE, "GOLD DIGGERS"

"'Em," of course, means the faction among the directors opposed to Mr. Mitten. "Pop," of course, means Mr. Mitten himself. Besides "'Em" the directors opposing Mr. Mitten have become known as the "Gold Diggers." This term was concocted to be applied to the bolting directors as a peculiarly fitting appellation. The plan of the "Gold Diggers," so it is explained, is to seize the property, depose Mr. Mitten and then work the road entirely in their own selfish interest. Whether or not you accept this statement to be true depends of course on whether you happen to be a Mitten partisan.

One thing, however, is certain. The employees are rallying to the support of Mr. Mitten with all the resources at their command. Although Mr. Mitten advised them against entering the fight with any of their own personal funds or the funds of the Employees Co-operative Association they have chosen to disregard the warning in their efforts to help him and have purchased 10,000 shares of stock and pledged them to the aid of Mr. Mitten.

Not only did they do this, but a delegation from the men bearing the resolutions containing the signatures of 10,000 employees called upon W. J. Montgomery, one of the opposition directors, at his office in the Eighth National Bank. They implored him by a letter presented to him personally "to give us your proxy to vote in our interest so that we can go back and tell the men that the whole thing has been a big mistake and they can go on working contentedly." Mr. Montgomery received the delegation silently but politely. That was all. This was the word brought back by the spokesman himself.

While their ownership in the company is a source of strength to the employees, it is also a source of weakness, for should Mr. Mitten be unhorsed or his policies changed the employees would find themselves loaded up with shares in a company with the management and policies of which they might no longer find themselves fully in accord.

THE ISSUES STATED

But what do the directors opposing Mr. Mitten want, anyway? They want "a real part in the management of the company's affairs." Those are the exact words. As for Mr. Mitten, what does he want? His most significant want now is a share in the earnings of the company for the employees, that share to be dependent upon and commensurate with the skill which the men show in increasing the profits of the company. Mr. Mitten has said publicly that he is making it a condition of his continued management of the property—a thing he is going to ask the stockholders to do—that the employees shall receive financial recognition beyond the average of the four cities upon which the Philadelphia wage is based, "because you deliver a quality of service that they know nothing about." Here are Mr. Mitten's own words:

> What I want to say to the stockholders at the next annual meeting on March 15 is that for the super-co-operation I expect you will produce, they shall assent to my paying to the men and women at the close of the year, after the payment of the P. R. T. dividend, a co-operative wage dividend, which shall be within the net income earned, the added net income earned by this super-co-operation, and that it shall not for this year exceed 10 per cent of the payroll.

Street railways have been known before to have caused a whole city to talk about them, but never for quite the same reasons as those that govern now in Philadelphia. As if Mr. Mitten's remarks and the news items and editorials in the papers were not enough full page advertisements have appeared in the dailies containing these and similar statements:

> Think of it, folks! A dozen years ago many of our people actually didn't know where the next meal was coming from. Helpless slaves of an unconscionable machine that eventually goaded them into a desperate attempt to break the shackles of industrial despotism.
>
> Face the facts, folks! I have not spared our part in the débâcle of 1910, and I'll not spare those who, before God and man, were most responsible for that tragedy. Names highly placed in Philadelphia's social directory sucked the cream, while the men who operated their road had to be content with the skim milk.
>
> In 1910 we were first cousins to an almshouse. Today, we are a responsible, law-abiding, industrious body of men and women. Better railroaders, better citizens, better family men. We're making good, folks, on the only real chance we've ever had.
>
> We have said that Mitten's enemies are our enemies. Well so they are, and why shouldn't they be? Have we anything to look forward to under the leadership of men who seek covertly to destroy what we have been eleven years building?

Is it any wonder all Philadelphia hangs breathless, as it were, on the outcome?

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167 Miles of Municipal Line in Detroit

Detroit's municipal railway system observed its first birthday anniversary on Jan. 16, 1922, the first city-owned car having been run over the Charlevoix-St. Jean line of Jan. 16 last year. During the year the city has acquired a system of 167 miles of track. Of this 117 miles are in operation. Sixty miles were built, 29 miles bought from the Detroit United Railway under the day-to-day agreement and the remaining mileage is under joint operation.

According to Joseph S. Goodwin about 50 more miles will be in operation early in February, including the Grand Belt and the Epworth-Highfield lines. Passengers are being carried at the rate of 60,000,000 per year and 428 cars are being operated. Forty-five Peter Witt cars have been put in operation and 128 cars purchased from the Detroit United Railway. The remainder of the cars are safety cars. The municipal railway force numbers 1,423 employees, 561 in the operating forces and 468 on construction work.

The addition of 9 miles of new track just completed will close up the gaps and complete a new outer belt line 35 miles long which will serve thickly settled districts now in need of car service.

The new belt line will extend from the Charlevoix-Buchanan municipal lines on the west, northerly over Junction Avenue and the Epworth Highfield lines and complete the belt by connecting with the Charlevoix-Buchanan line again at Van Dyke on the east. Some of these sections have been operated individually, but will be connected into the main system.

Milwaukee Electrification Discussed

Plans for the electrification of the steam railroads in Milwaukee, Wis., are being discussed by a special committee of City Council, railroad representatives, railroad rate commissioners, the city attorney and various engineering societies.

Super-Power Report to Be Discussed Further

Now that ample time has been given to secure the reactions of the electrical industry to the super-power report, the members of the advisory board are to be called together in the near future for further discussion of the project.

Dr. George Otis Smith, the director of the United States Geological Survey, under whose direction the super-power report was prepared, believes that the showing of economics presented in the report has stimulated interconnection between existing systems throughout the country. The nation-wide interest that has been taken in the report is indicated by the fact that the entire edition of 10,000 copies of the report has been exhausted. In addition literally thousands of inquiries have been received in regard to various phases of the problems involved. Other evidences of the interest aroused, Dr. Smith points out, are had in the space given to this project in the technical press and the large amount of discussion which it has incited in technical societies. The exact date of the meeting of the advisory board had not been fixed at the time of this writing.

Commerce Secretary Hoover states that the super-power report has stimulated the desire for similar studies in the Pittsburgh-Chicago area and in other sections.

Suggestions Offered for Railway's Consideration

At the reorganization meeting of the City Council of Johnstown, Pa., recently, Mayor Cauffel suggested ways by which the city could take its place as one of the leading second-class cities. He said that the Johnstown Traction Company should be petitioned to pay the city a certain percentage of fares collected on lines to Luna Park; that it was only fair that the company should help maintain the park, the heavy traffic to which adds considerably to the funds of the railway.

In his readjustment plan he urged a reduction of the 7-cent fare in view of the reduction in wages, and would call upon the railway to do what it could for the transportation of school children. He said it would be a splendid spirit of community pride for the railway to grant the children the privilege of riding for 1 cent.

Pacific Grove Franchise Attacked

Alleging that the Monterey & Pacific Grove Railway, Monterey, Cal., has failed to pay its franchise tax of 2 per cent of its gross annual receipts since Jan. 1, 1918, and that it has abandoned operation on part of its line in Pacific Grove, the state of California and the city of Pacific Grove have brought suit against the company. They ask that the franchise, which Pacific Grove gave the company, be declared forfeited.

The trustees of Pacific Grove on Jan. 3 passed a resolution declaring the franchise forfeited.

The company operates an electric line between Del Monte, Monterey and Pacific Grove. No cars have been operated for three years over the line in Pacific Grove extending from the corner of Lighthouse Avenue and Nineteenth Street, to the intersection of Nineteenth Street, Briggs Avenue and Ocean View Avenue, and thence westerly along Briggs Avenue to the Southern Pacific Railroad depot.

Negotiations Over Interurban Suspended

Because one member of the City Council of Saginaw, Mich., opposed a proposed franchise for the Michigan Railroad for its Flint to Bay City line negotiations between John C. Weadock, New York, and the Council ended on Feb. 14, when Mr. Weadock, representing the utility, took the position that it was needless to go any further. Since the Saginaw-Bay City Railway went into the hands of a receiver and ceased operating city cars on Aug. 10 the interurban line has operated by permission of the Council.

The state and city plan to improve Genesee Avenue to the southerly city limits this summer and asked the interurban to move its tracks from the side of the road to the center for a distance of about a mile. It was believed the interurban was willing to meet all city terms, but Commissioner Phoenix took the position that if the city or some railway other than the interurban desired to operate on the streets used by the interurban, permission should be granted and no rental should be charged, the joint user of the tracks merely being required to assist in making repairs. The next move is now up to the Council. It is believed that rather than lose $100,000 which the state would contribute to the cost of the pavement, interurban cars will be stopped at the city limits. Action along this line will not develop, it is expected, before Feb. 22.

Auto Club and Railway Co-operate for "Safety"

Close co-operation between the Des Moines (Iowa) City Railway and the Des Moines Auto club was arranged at a recent meeting of the directors of the auto club with D. M. Finch, head of the claims department for the railway. The two organizations will sponsor a "safety week" within a very short time looking toward educating the public in the elimination of accidents.

In the meeting plans were discussed for arriving at a better understanding of present city ordinances in regard to automobiles passing unloading cars, cutting in ahead of street cars and driving at an excessive speed. The two clubs will have charts prepared illustrating the causes of the majority of accidents in Des Moines and suggesting means of precaution which will result in cutting down the number of accidents. Mr. Finch told the automobile club that efforts would be made to enlist the active support of every motorman and conductor in the Des Moines force to join in the safety week campaign.

Wages Reduced in Duluth

New rates of pay on the Duluth Street Railway in both Duluth and Superior became effective on Jan. 16. They affect all conductors and motormen. The extra list is reduced to six motormen and conductors, guaranteed a minimum of $3.25 a day. If this list is enlarged the men will rotate. At the present time there are fifteen extra crews, but the company finds runs daily for most of them.

Herbert Warren, vice-president of the company, says that it was found necessary in the interests of sound economy to ask the men to take a cut at this time.

The final hearing on the fare matter, now pending before the State Railroad & Warehouse Commission, was set to be held at St. Paul on Jan. 31.

HOURLY RATES OF PAY FOR CONDUCTORS AND MOTORMEN IN DULUTH, MINN.

(Cents per hour)

	First 3 Months	Second 3 Months	First 6 Months	Second 6 Months	Second Year	Third Year	Fourth Year	Fifth Year	Sixth Year	Seventh Year	Eighth Year
Previous to 12/1/90*	13⅓	13⅓	13⅓	13⅓	13⅓	13⅓	13⅓	13⅓	13⅓	13⅓	13⅓
12/1/90 to 9/30/92*	14⅘	14⅘	14⅘	14⅘	14⅘	14⅘	14⅘	14⅘	14⅘	14⅘	14⅘
10/1/92 to 8/31/93*	13⅓	13⅓	14⅘	14⅘	16	16	16	16	16	16	16
9/1/93 to 10/31/96*	12	12	13⅓	13⅓	14½	14½	14½	14½	14½	14½	14½
11/1/96 to 3/31/99*	11⅓	11⅓	12⅓	12⅓	13¾	13¾	13¾	13¾	13¾	13¾	13¾
April 1, 1899	15	16	..	17	17	17	17	17	17	17	17
May 1, 1900	..	..	17	17	18	18	18	18	18	18	18
June 1, 1902	..	..	18	20	20	20	20	20	20	20	20
Jan. 1, 1906	..	..	20	20	20	21	21	22	22	22	22
June, 1907	..	..	21	21	22	23	24	25	25	25	25
July 1, 1912	..	..	22	23	24	25	26	26	27	27	28
March 1, 1916	..	..	23	24	26	27	28	29	30	30	30
Oct. 1, 1916	..	..	26	26	28	29	30	31	32	32	32
June 1, 1917†	..	..	28.6	28.6	29.4	30.45	31.5	32.55	33.6	33.6	33.6
Oct. 1, 1917	..	..	29	29	31	32	33	34	35	35	35
April 1, 1918	..	..	32	32	33	34	35	36	37	37	37
Aug. 1, 1918	..	..	34	34	35	36	37	38	40	40	40
Sept. 1, 1918	..	..	38	38	40	42	42	42	42	42	42
Aug. 1, 1919	..	..	41	41	43	45	45	45	45	45	45
Oct. 1, 1919	..	..	44	44	46	48	50	50	50	50	50
Oct. 1, 1920	..	..	49	49	51	53	55	55	55	55	55
Jan. 16, 1922	..	..	44	44	46	48	50	50	50	50	50

* Previous to March 31, 1899, monthly wages were paid on basis of twelve hours' work a day on every day of the month. Such wages are shown above reduced to an hourly basis for a thirty-one-day month.

† Including war bonus.

Subways Considered a Luxury

Although not yet convinced that Detroit needs a more rapid system of transportation at the present time and under present conditions, Mayor James Couzens will appear before the next State Legislature to ask permission to raise the bonding limit for public utilities from 2 per cent to 4 per cent, according to a recent announcement. The Mayor said that for years the matter has been discussed and considered by public officials. He is willing to build anything the people ask and vote the money to build with. He will not advocate doing that which experts advise is financially impracticable.

In announcing that he would move to have the bonding limit raised, the Mayor drew attention to the fact that if the Legislature granted such permission, the action could not become effective before August, 1923, and the city's needs at that time cannot be definitely anticipated now. With the first step taken leading to financing rapid transit, part of the problem would be solved in case the people should decide upon subways or elevated lines.

At present Mayor Couzens considers subways for Detroit would be a luxury and to construct such a system as would satisfy the people would necessitate the expenditure of $100,000,000. The city at this time cannot afford to spend this amount, which would be necessary to treat all sections of the city alike. Elevateds are not favored by the city officials and it is the Mayor's belief that the people would not tolerate an elevated system. People on the east and west sides of the city would not be willing to mortgage their property to build a subway to relieve North Detroit alone, but anything that is to be done must be done for the whole city.

The 2 per cent of the assessed valuation as now provided for limits the issuance of public utility bonds to $36,000,000. The increase to 4 per cent would provide for bonds to the amount of $72,000,000 or more should the present valuation be increased.

Light-Weight Interurban Cars Inspected

The General Electric Company entertained a delegation of electric railway executives from various parts of the United States and J. Furukawa, engineer of the Imperial Railways of Japan, with a dinner and theater party at Cincinnati (Ohio) on Feb. 7. The entertainment followed an inspection of the new light-weight interurban cars being built by the Cincinnati (Ohio) Car Company for the Kentucky Traction & Terminal Company, Lexington Ky. At the plant of the Cincinnati Car Company every detail of construction of the cars was explained. The visitors also were shown the cars in the various stages of construction.

On the evening of Feb. 7 the dinner was served at the Hotel Gibson. J. P. Pope, general manager of the Kentucky Traction & Terminal Company, was toastmaster.

A New Coxey's Army

Lew Shank of Indianapolis in a New Mob Scene Staged in Protest to Commission Decision

For the first time in the history of the city of Indianapolis, Ind., the public was treated to the spectacle of a newly elected Mayor leading an embryo Coxey's army to the State House to protest against a Public Utilities Commission decision. Two of the daily papers treated the matter from a strictly news standpoint, but a paper generally unfavorable to the public utilities issued a demand for at least regular procedure in settling rate questions. Still another paper sought to make a political issue out of the demonstration.

LEW SHANK IN ACT OF ADDRESSING THE MULTITUDE FROM THE STATE HOUSE STEPS

After a parade from the City Hall, the crowd, which was headed by a band, stood massed on the south lawn of the State House for nearly a half hour, while Mayor Shank denounced the commission for its recent order permitting the Indiana Electric Company to issue $17,496,000 of securities, and roundly criticised and ridiculed members of the commission. He included Governor McCray in his remarks.

The Mayor sent a committee into the Governor's office to ask him and the commission members to come out. The Governor sent back word that he would receive whatever delegation cared to come into his office. The Mayor then left for the City Hall without seeing the Governor or the members of the commission, but, after considerable delay, the committee and a few of the persons who had jammed the corridors went into the Governor's office and through their spokesmen presented their protest.

Governor McCray suggested that they go to the office of the commission and have the commission explain its order, but none of the delegates appeared there.

The demand that members of the Public Service Commission be discharged was never made. In fact, the only attack on the commission was made by the Mayor in his speech on the outside, and the Governor and the other state officials did not hear this speech.

The official call issued by Mayor Shank for the parade at the State House was as follows:

> I, Samuel Lewis Shank, Mayor of the city of Indianapolis, this 28th day of January, 1922, request all good citizens who believe in the rights of the people and the control of their own city affairs, to join the many hundreds of taxpayers and citizens in a just and lawful protest, at the Indiana State Capitol, Monday at 10 a.m., against the manner in which our public utilities are handled by the State. This is not a mob nor a bunch of "hoodlums" but a just demonstration to show the Governor that we are opposed to any increase in rates or in permitting any merger of electric light companies, gas companies, water companies and traction companies into one large combination.

The agitation in Indianapolis against the decision has not been without effect, for the city of Kokomo and various other Indianapolis industrial concerns have filed a petition with the commission asking for a rehearing of the case.

The petition contains fifty-one paragraphs, each setting out a reason why the order complained should not stand. The petition contends the corporation is not a utility and cannot legally function as a utility. The petitioners object further that the order was issued on an amended petition filed after the original petition had been decided. On the subject of capitalization, the petitioners object that the capitalization authorized is in excess of the total capitalization of the companies involved. The purchase of the utilities is characterized as a merger and as such, the petitioners aver, does not comply with the utilities law. The petitioners object to holding companies and contend the order of the commission adds another holding company to five already in existence. The petition goes into considerable detail on the involved ownership of most of the utilities concerned.

One of the principal contentions is that the commission does not show the companies are able to make a fair return on the securities authorized, and the order does not show the income will be sufficient to meet fixed charges.

Bus Regulation a Problem

When negotiations between the City Council and the Northern Ohio Traction & Light Company, Akron, Ohio, are resumed shortly, relative to a new permanent franchise for operation of the local Akron lines, the matter of the jitney service is expected to play an important part in whatever amiable settlement is reached.

It is considered probable that the company in seeking a service-at-cost franchise with the city, will endeavor to have incorporated in the franchise ordinance a provision which will restrict or at least regulate bus operation in the city. A check by the company shows that jitneys and buses are carrying an average of 20,000 passengers daily. This means that in a year's time jitneys and buses take $350,000 to $375,000 a year in revenue away from the railway. Last year there were 589 jitneys and buses in operation as compared with 489 in 1920.

Officials of the company say that should jitney and bus traffic be regulated and reduced, a lower car fare might be possible. The railway is now operating under an emergency ordinance providing for a flat 5-cent car fare. The previous rate was six tickets for a quarter. Under a new franchise a sliding rate of fare would be sought, based upon the rate of return.

To Know and Be Known Campaign Started

A campaign to "humanize" the Indianapolis, Columbus & Eastern Traction Company, formerly a part of the Ohio Electric Traction system, has been launched by the receiver, J. H. McClure. Motormen and conductors have been requested to learn the names of those patrons who travel regularly on their cars and to greet them by name whenever possible. The names of the members of the crew of each car are also posted on the car in a prominent place.

By injecting a more personal relationship between the traveling public and the employees, the receiver believes that many causes of complaint will be eliminated and that benefits will be shown in increased patronage of the traction line.

Send in Your Name!

The National Safety Council is now taking a census of all the persons engaged in safety and industrial health work in the public utility industries, as well as all persons engaged in these activities in every other industry and in public safety work also. To date it has never been established definitely how many persons in the public utility industries are engaged in accident prevention and industrial health work, or how the various types of utilities compare with each other or with other industries in this respect.

The census will include not only members and employees of members of the National Safety Council, but all persons engaged in safety and industrial health activities and not connected with the council at all. Many of the largest electric railways are members of the council.

Every reader of the ELECTRIC RAILWAY JOURNAL who is professionally engaged in industrial or public accident prevention or industrial health work—whether he is devoting all or only part of his time to accident prevention—is urged to assist in the taking of this census by sending his name to the National Safety Council, 168 North Michigan Avenue, Chicago, which will furnish a census form to be filled out and returned to the council.

News Notes

Toronto Votes to Buy Railway.—By a vote of 16,087 to 13,580 Toronto recently voted a by-law authorizing the City Council to buy the Toronto Suburban Railway. This line is owned by the Dominion government and operated as part of the Canadian National Railways.

Another Railroad Considers Use of Motor Car.—Gasoline motor car interurban service between Evansville, Ind., and New Harmony, is being considered by officials of the Illinois Central Railroad. The company will take off the steam trains on the branch of the road from Stewartsville to New Harmony because they no longer pay and motor cars are being considered for use in their place. New Harmony is about 30 miles west of Evansville and about 10 miles from Stewartsville.

Bill Provides for New Commission.—The present session of the South Carolina Senate has passed a new law providing for the formation of a new State Railroad Commission to consist of seven members, one from each congressional district of the State, and its consolidation with the present Public Service Commission. The Railroad Commission now has only three members. The new commission will have full charge of public utility rate matters in the State, and other details of public utility operation, if the bill is also passed by the House.

Winnipeg Mayor Lauds Conciliation.—The policy of conciliation which the Winnipeg (Man.) Electric Railway and the city of Winnipeg have followed in regard to traction problems was praised in the Mayor's inaugural address recently. The problem is a financial one now, the Mayor said. The company contends it cannot get money for the necessary work, unless it has an extension of its existing franchise beyond 1927. On that date, he explained, the city has the right under the franchise to take over the traction lines if it has given one year's notice of its intention. The Mayor urged that the matter of municipal ownership be carefully considered.

Wants to Acquire Railway Property.—The committee on harbors and public lands of the Massachusetts Legislature has voted in favor of a resolution to authorize the Mount Tom Reservation commissioners to acquire from George Pellissier, assistant general manager of the Holyoke Street Railway, a tract of land comprising about five acres, including the celebrated Dinosaur Ledge, with its tracks of the mammals of prehistoric times. This property, adjoining Mountain Park, has been owned for many years by electric railway interests.

Mayor Defends Railway. — When Mayor Crawford of Mobile, Ala., objected to the adoption of a resolution by Commissioner Hartwell, that the city accept a lease of one dollar a year for certain railway lines of the city as advertised by the Mobile Light & Railway Company, the resolution went over for consideration at a later date. The Mayor defended the railway, saying he did not be believe it to be the policy of the railroad to abandon its lines or furnish the people with inadequate service as charged by Mr. Hartwell.

Favors Separate Franchises.—The community committee, which has been devising plans for a solution of the franchise difficulties confronting the Aurora and Elgin city line and the interurban lines of the Fox River division of the Aurora, Elgin & Chicago Railroad, have gone on record as disapproving a uniform franchise for all the cities served by the company. Judge Evan A. Evans has been notified of the committee's attitude. The auditing of the traction company's books will be conducted by the corporation counsels of Aurora, Elgin and Dundee, assisted by a valuation expert, an electrical engineer and an accountant from the Illinois Commerce Commission.

Hamilton Company Needs 5-Cent Fare.—Mayor Coppley of Hamilton, Ont., is in favor of reopening negotiations with the Hamilton Street Railway to accomplish, if possible, restoration of adequate service on the part of the company and financial relief from the city by means of a straight 5-cent fare. E. P. Coleman, general manager of the Dominion Power & Transmission Company, which controls the Hamilton Street Railway, said that nothing less than the 5-cent fare would relieve the financial distress of the company. He said that if the eight limited tickets for 25 cents were withdrawn receipts would be increased approximately $50,000 only, but that the withdrawal of six unlimited tickets for 25 cents would add $150,000 to the income yearly. The adoption of a straight 5-cent fare was defeated by Hamilton voters at the polls on Jan. 2. The City Council, however, has the power to approve of the 5-cent fare, and it is considered possible that the Council may disregard the voters' decision and increase the fare to some extent at least.

Financial and Corporate

City a Hard Bargainer

Detroit Indicates Local Railway Must Pay Huge Price for Its Campaign of Opposition

In a letter to the stockholders of the Detroit (Mich.) United Railway, the Street Railway Commission outlined and reviewed past conditions in the city of Detroit and stated that the city has now reached a position where it desires to extend its municipal railway system to all parts of the city and particularly on streets where franchises of the Detroit United Railway have expired. This represents approximately 150 miles of single track. It is a question either of construction or purchase. The letter was read by the Mayor at the stockholders meeting to which he was admitted as the owner of one share.

The Street Railway Commission warned the company that the city has always attempted to solve the railway question without destroying the value of the system to the city, but that the point in the controversy has been reached where final action must be speedily taken. The letter further states that if the stockholders do not authorize the sale of the property to the city on terms satisfactory to the city or empower the directors or a committee to arrange the sale subject to the ratification by the stockholders at a special meeting called promptly for that purpose, further negotiations would be considered of no avail by the commission and each side should then proceed according to its legal rights. This enforcement of its legal rights by the city would, it is believed, include carrying out the terms of the ouster ordinance forcing the company to remove its tracks from Woodward Avenue and Fort Street.

In reviewing the past the commission cites that in each step made by the city looking toward municipal ownership the company has opposed the desires of the people by lawsuits and propaganda. A specific instance cited is the attack made by the company on the validity of the election of 1919 in which it was sought by a series of lawsuits to defeat the entire municipal ownership program and to enjoin the city from constructing the municipal railway system or from marketing the issue of bonds sought to be sold to provide funds to build the municipal railway. The number of lawsuits started and the surprising positions taken in the lawsuits by the company and its attorneys are mentioned. At the present time there is still pending a suit in which one of the company's officials seeks to have the election of April 5, 1920, declared void.

Despite this attitude on the part of the company, the city system has been built and is in operation, but the cost to the city in interest charges on the bonds sold has been much greater than would have been required except for the lawsuits.

The commission stated that it had had its street railway organization make an estimate of the value of the company's property, except real estate, in the city and the value placed upon it after proper deduction for depreciation is approximately the sum of $16,500,000. This is substantially on the basis of the inventory contained in the agreement of March, 1919, certain changes being made necessary by reason of a different number of cars and a difference in the number of miles of track. The estimate also includes the assessed value of real estate included in the former agreement. This valuation would be increased by the difference between the assessed valuation of the real estate and its actual value.

The commission considers the suggested price of $24,500,000 for the company's city system inclusive of real estate, as mentioned by the directors' committee, entirely too high.

Bondholders Called Upon for Cash in Reorganization Plan

The reorganization plan of the Aurora, Elgin & Chicago Railroad, Third Rail Division, Wheaton, Ill., has been completed by the committee of which R. M. Stinson, Philadelphia, is chairman. The committee represented the first and refunding mortgage 5 per cent bonds due in 1946 and three-year collateral trust notes due in 1921, secured by the first and refunding mortgage bonds.

A new operating company will be incorporated to take title to most of the property and continue operation. The capitalization of this operating company will consist of common stock in an amount approved by the Illinois Commerce Commission. There will also be created a refunding and improvement mortgage by means of which funds can be provided to meet present and future capital requirements and refund the present 5 per cent bonds.

First and refunding bondholders agreeing to the plan of reorganization must pay $35 per $1,000 bond, the pro rata share of the expenses of the committee. They will receive a $500 face value 6 per cent debenture bond of a holding company. Upon payment of $200 in cash they will receive a $200 face value 7 per cent refunding and improvement bond of the new operating company, $700 face value of the 6 per cent debenture bonds of the holding company and three shares of the holding company common stock voting trust certificates. A similar plan has been worked out for holders of the three-year collateral notes.

$25,305 Loss in Des Moines in December

Beneficial results of operation under the provisions of the new franchise are shown in the financial report of the Des Moines (Iowa) City Railway for the month of December, 1921. Although the report shows the company still operating in "the red," the tendency is toward an improvement.

The fact that there was bus competition during the first twenty-seven days of the month caused a loss in revenue figured at $31,000 and in addition there was an extraordinary expense amounting to $9,000 for the reinstallation of the substation equipment which was removed last May. If it had not been for these two items it is thought the figures would have shown a balance on the right side of the ledger of $16,000 instead of a deficit of $23,305.

Revenues	
Transportation revenue	$173,746
Other revenue	8,789
Total revenue	$182,535
Operating expenses and taxes	
Operating expenses (including depreciation)	$154,910
Taxes	14,000
Total	$168,910
Fixed charges	
Bond interest	$20,312
Loan and note interest	16,618
Total fixed charges	$36.930
Deficit	$23,305

During December the company operated 124 cars during the rush hours and seventy-two during the non-rush hours. Since then additional cars have been put on and on Feb. 11 General Manager Chambers announced a further increase during shopping hours for the University line, one of the heaviest in the city.

The figures shown in the December report are given in the table above.

Preferred Stockholders Protected in Reorganization

Slow progress is being made by those back of the movement initiated by the stockholders' protective committee to block the reorganization plan of the American Cities Company. The preferred stockholders, who had until Feb. 11 to join in an effort to stop the execution of the reorganization, were tardy in responding to the invitation extended to them to depost their shares.

According to S. A. Trufant, chairman of the stockholders' committee, the equity of the preferred stockholders would be wiped out if the proposed plan were carried into effect, hence the need of concerted action by stockholders.

L. G. Root, New Orleans, representing Isidore Newman & Son, local bankers, in a published statement, has called to his aid figures intended to convince holders of preferred stock that under the plan contemplated they will not only be protected in whatever equity they may have, but by participating in the reorganization will be able to obtain 7 per cent income bonds worth more than twice as much as their original investment.

Reorganization Plan in Preparation

Efforts at reorganizing the Cleveland, Southwestern & Columbus Railway, which, since Jan. 20, has been operated under the receivership of F. H. Wilson, formerly president of the company, are now being made by Hayden, Miller & Company, Cleveland, investment bankers. That company was requested by more than a majority of the holders of the $3,628,000, par value, of the company's first consolidated mortgage bonds maturing April 1, 1927, to attempt the reorganization.

In a letter sent out by Hayden, Miller & Company, addressed to the holders of the bonds and stocks of the

> Cleveland & Elyria Electric Railroad 6 per cent bonds, extended to Feb. 1, 1923.
>
> Elyria & Oberlin Electric Railway 6 per cent bonds, extended to Aug. 1, 1922.
>
> Cleveland, Borea, Elyria & Oberlin Railway 5 per cent bonds, extended to Feb. 1, 1923.
>
> Cleveland, Elyria & Western Railway 5 per cent bonds, matured Aug. 1, 1920, extended at 7 per cent to Feb. 1, 1923.
>
> Elyria, Grafton & Southern Railway 5 per cent bonds, matured Jan. 1, 1922.
>
> Cleveland & Southwestern Traction Company 5 per cent bonds, maturing Feb. 1, 1923.
>
> Ohio Central Traction Company 5 per cent bonds, matured June 1, 1919, extended at 7 per cent to Feb. 1, 1923.
>
> Ohio Central Traction Company 5 per cent bonds, maturing March 1, 1923.
>
> Norwalk Gas & Electric Company 6 per cent bonds, extended to Feb. 1, 1923.
>
> Cleveland, Southwestern & Columbus Railway 5 per cent bonds, maturing April 1, 1927.
>
> The preferred and common stock of the Cleveland, Southwestern & Columbus Railway.

it is stated:

> Although needed as a strict measure of preservation of the property of the railroad, it is believed that the receivership will offer an opportunity for a reorganization advantageous to all security holders.
>
> Based on careful studies which have been made for some time of the railroad properties, its earnings and future opportunities, a plan of reorganization is now in course of preparation which it is hoped, can be submitted to the security holders within the next thirty days. Upon submission of such plan, all security holders will be given the opportunity of depositing their securities with trust company depositaries in Cleveland and in several other financial centers. No deposits of securities will be asked except upon final formation of the plan.

$189,620 Net Income for Hagerstown & Frederick Railway

After deducting interest charges, preferred dividend payments and other items, the net income of the Hagerstown and Frederick Railway, Frederick, Md., for the twelve months ended Dec. 31 last totaled $189,620, equivalent to approximately 12 per cent on the $1,500,000 outstanding common stock.

Gross revenues for the year totaled $2,047,611, an increase of $31,388 over 1920, while operating expenses were reduced, the total being $1,166,075, or $114,916 less than the year before. Gross income amounted to $931,307, or $183,007 more than in 1920. After interest charge deductions, net income is given as $282,620, or a gain of $72,229 for the year.

The dividend on the preferred stock issue, together with other items, amounted to $93,000, leaving final net income or surplus of $189,620. The corporate surplus as of Dec. 31, 1921, totaled $536,145.

$892,389 Increase in Net

Eastern Massachusetts Street Railway Went from a Deficit of $660,535 to the Profit Mentioned, or a Change of $1,552,925

Another Massachusetts road has made a remarkable record of earnings in 1921. It is the Eastern Massachusetts Street Railway. The net income of that company for the year recently closed was $892,389. This compares with a deficit of $660,535 for the previous year. Thus the real gain is $1,552,925. There have of course been a number of contributing factors to this showing, but of them none perhaps stands out more noticeably than the one-man car.

In December, 1921, 96 per cent of the total miles operated was by one-man cars. The trustees say very frankly that these cars have provided the means of reducing fares and continuing in existence a large part of the system, including many city lines which otherwise could not have been operated. They saved the company $1,250,216.

The trustees present the accompanying report for year ended Dec. 31, 1921.

COMBINED FINANCIAL STATEMENT OF THE 17 OPERATING DISTRICTS

	1921	1920
Passenger revenue	$10,681,350	$12,374,409
Freight and other revenue	36,899	286,403
Rentals, advertising, etc.	265,122	253,997
Interest—Other income	334,891	280,464
Total revenue	$11,318,264	$13,195,275
Expenses:		
Way and structures	$1,768,078	$1,973,583
Equipment	1,518,279	1,874,077
Power	1,350,996	2,050,120
Car operation	2,658,888	5,006,125
Injuries and damages	362,312	313,638
Insurance	†153,961	141,050
Law expense	9,912	15,784
Rent of tracks	79,017	105,141
General wages and expenses	263,910	293,625
Miscellaneous expenses	288,745	290,501
Operating expenses	$8,454,103	$12,063,648
Taxes	348,750	204,017
Gross income	2,515,410	927,609
Interest and rentals	1,623,021	1,588,145
Net income	$892,389	*$660,535*

Cost of service requires gross income of approximately $2,400,000. Operating expenses includes depreciation charges amounting to $1,146,806 in 1920 and $992,847 in 1921.

† Includes $80,000.00 added to insurance fund.

Note.—Italics denote deficit.

Gross receipts from car fares in 1921 were $1,693,060, or 13 per cent less than in 1920. This was due principally to the continued industrial depression affecting every city and town in the system. In the textile and shoe and leather centres, especially, the prolonged unemployment of thousands of operatives inevitably caused a very large falling off in revenues.

A considerable part of this shrinkage of receipts, however, is accounted for by fare reductions made in different districts, in accordance with the service-at-cost plan of the public control act. These reductions have resulted in a saving of approximately $600,000 to the car riders, and represent an investment in good will and confidence in this street railway which has materially aided the Public Trustees in maintaining friendly relations with the public.

In the past year 35,000 joints have been electrically welded, this being a larger number than in the entire previous history of the company. The trustees propose to have all joints on rebuilt track welded as rapidly as possible and then turn attention to joints on other trackage. It is expected that track work during another season will put the operated rails in satisfactory condition. The tracks were well maintained during the past year at less cost than in 1920, and all buildings in active use have been kept in good condition.

Equipment expenditures were reduced $355,797, or 19 per cent. Contributing causes were the operation of 250 new one-man cars, improved track conditions and better shop management. Equipment expenditures were 7.67 cents per car mile, compared with 8.30 cents in 1920. The equipment is rapidly being placed in first-class condition and it will be the policy of the company to so maintain it hereafter.

FARE REDUCTIONS

Provisions of the service-at-cost plan control the fixing of fares in the operating districts. Each district is operated as if it were a separate street railway. Earnings and expenses are accounted for independently in these districts, and itemized financial statements are made available for public inspection. During 1919 and 1920 expenses increased rapidly, and it was necessary to raise fares. In 1921 expenses gradually decreased, and the public trustees have reduced fares accordingly. Net earnings so improved in some districts that more than one fare reduction was made during the year.

One dollar punch card tickets are now sold at the rate of 6¼ cents a ride in Lowell, Salem and Quincy; 5 15/17 cents a ride in Lawrence and Brockton; 5 5/9 cents a ride in Lynn, and 5 cents a ride in Fall River. About 87 per cent of the city riders on this property are now using reduced rate tickets.

The trustees say that full, free and frank discussions with municipal officials and service committees at numerous conferences have had a tendency to brush aside misunderstandings and in many instances, brought about improvements in service and fare reductions which a failure of co-operation might have made extremely difficult if not impossible.

Power costs were reduced $699,123 or 34 per cent. Reduction in coal prices, installation of oil burning machinery at the Quincy Station, the use of lighter weight cars and more efficient power house operation have been factors in this large saving.

Operation of cars shows a reduction in cost of $2,347,236. Of this saving $1,250,216 is attributable to the operation of one-man cars. The balance was due to consolidation of carhouses, more favorable winter conditions in 1921 and more economical car operation.

Injuries and damages increased somewhat due to collisions between cars and motor vehicles. Reckless driving by motor vehicle operators is the principal cause. No increase in accidents or damages can be traced to the change from two to one-man operated cars, as the trustees say.

In 1920 the public trustees, after an analysis of the fire record of the company for thirty years, decided that the company should insure itself against fire and established an insurance fund of $100,000. The fire losses for 1920 and 1921 were $28,779, and the insurance premiums at the usual rates would have been approximately $120,572. The trustees propose to add to the insurance fund from time to time until it amounts to $200,000. A fire prevention inspector is constantly visiting all fire risks to see that they are adequately protected. All important carhouses have sprinkler protection. In 1921 the company organized the Eastern Mutual Insurance Company. Liability Insurance for employees industrial accident is carried with this company at a considerable saving in cost.

The trustees acknowledge their indebtedness to the local service committees for their assistance in solving many railway problems. The members of these committees have taken a keen interest in street railway affairs and given much valuable advice to the local management regarding service, fares, and other matters affecting the car rider.

Underlying bonds	$5,160000
Serial bonds	2,833,000
Bay State equipment notes	784,000
Refunding bonds 4½ Series A	14,956,000
Refunding bonds 5 Series B	2,834,400
Refunding bonds 6 Series C	972,000
Refunding bonds 6 Series D	798,700
Refunding bonds 6 Series E	500,000
Total bonds	$28,838,100
First preferred stock 6 per cent	4,058,800
*Preferred B stock 6 per cent	2,996,800
*Adjustment stock 5 per cent	8,711,200
Common stock	8,362,600
Total stock	24,129,400
Total all securities	$52,967,500

*Dividends on the preferred "B" stock and adjustment stock can be paid in cash or common stock.

In December, 1920, the trustees provided group life insurance for the benefit of the supervisory employees, the amount of the policies varying with the years of service, with a maximum of $3,000 in ten years.

In January, 1922, the trustees established a pension plan for employees seventy years old who have been continuously in the service for more than 25 years.

The labor agreement with the employees expired on May 1, 1921, and the disputed questions were submitted to the State Board of Conciliation and Arbitration. The board reduced wages an average of 12 per cent and relieved the company from certain burdensome and expensive war time conditions. The trustees immediately passed along to the car riders by reduction in fares the entire saving made possible by the State Board award.

The State of Massachusetts paid on Jan. 1, 1920 and 1921, a total of $100,000 matured serial bonds, in accordance with the special act of 1918. The State collected this amount from the cities and towns served by the company. On Jan. 1, 1922, the company repaid to the cities and towns the amounts advanced with interest, and also paid $300,000 serial bonds which matured on the same date.

The readjustment of securities proposed by the public trustees was declared effective on Jan. 3, 1922, and it is hoped to have all details consummated within a few weeks. The adjustment of deferred interest and accrued dividends places the company in a strong financial position and should enable it to build up necessary credit. The readjusted capital will be about as shown in the accompanying table.

New York Appraisal Figures Expected Soon

The work of appraising the railroad properties in New York City is virtually finished. The job began on May 6, when the appraisers were appointed by the Transit Commission in connection with the work of that body as directed to be carried out by the Legislature. It was said then that the preliminary work would be completed within six months.

What the figures show is not yet revealed, but it has been estimated roughly that the outstanding securities of the various traction companies aggregate a face value of $1,200,000,000, and that the valuation figure of the appraisers will be about $800,000,000.

The appraisal, it was said, would disclose the cost of replacement, compared with the original cost, on the basis of the value of the properties in 1914, and on the present value. Small attention, it was said, would be paid to the present cost of replacement. All the items are subject to deduction for depreciation.

Columbus Railway Coming Back

At the meeting of the board of directors of the Columbus Railway Power & Light Company, Columbus, Ohio, on Feb. 3, it was found that all fourteen members of the board were in accord with plans and activities of the management. As was stated in the ELECTRIC RAILWAY JOURNAL of Feb. 11 all officers were re-elected for the current year. It was brought out at this meeting that the company is entirely out of debt except for some back obligations to the city of Columbus and the liabilities as to bondholders and stockholders. The board voted to ask approval of the stockholders to permit the issuance of additional A and B preferred stock in amounts sufficient to pay the accumulated dividends on the same; and to ask the holders of these preferred stocks to take their back dividends up to April 1, 1922, in the new issue of similar stock.

March 18 Fixed as Date for Sale Under Foreclosure

The property of the Springfield, Troy & Piqua Traction Company, operating between Springfield, Ohio, and Troy, Ohio, will be offered for sale at public auction at the Clark County Court House on March 18 by the receiver, George Whysall. Approval of the order and date for the sale was set by Federal Judge John E. Sater in the United States Court at Columbus on Feb. 11. The court authorized the receiver to accept any bid in excess of $125,000 for the line. The highest bidder must pay down $25,000 at the time the bid is accepted, half of the remainder in thirty-five days and the balance within seventy-five days under the court's order.

This will be the second time that the traction line has been offered for sale since it was placed in the hands of a receiver several months ago. Some time back the property was sold to the bondholders of the road, through Guy M. Walker, New York, the trustee. When Mr. Walker failed to carry out his agreement with the court, the sale was set aside on application of the receiver.

While residents along the line are making every effort to secure a return of service, suspended about eight months ago, there appears to be little hope that it will be restored, and it is expected that the road will be junked by the purchaser if one can be found. Since the suspension of service, only a "shuttle car" has been in operation, this running between Springfield and the Victor Rubber Company at Maitland, a distance of 2 miles, and being operated solely to carry the plant's employees to and from work. Some switching operations in Springfield have also been carried out for local industries.

$843,000 in Certificates Offered

Stone & Webster, New York, N. Y., are offering $843,000 of Electric Railway Equipment Securities Corporation 6½ per cent equipment first gold certificates. The certificates are dated Feb. 1, 1922. They will mature quarterly May 1, 1922, to Feb. 1, 1927, inclusive.

The Electric Railway Equipment Securities Corporation, all of whose stock is owned by the General Electric Company, Westinghouse Electric & Manufacturing Company and the J. G. Brill Company, has been organized to assist in financing the purchase of standard electric car equipment. These certificates represent less than 75 per cent of the original cost of the equipment, the remainder having been paid in cash. As security, rental payments of the lessee companies are guaranteed by the Electric Railway Equipment Securities Corporation, which has obligated itself that at no time shall it have outstanding equipment trust certificates or other evidences of indebtedness in excess of ten times the amount of paid in capital.

Railway Changes Name

The Interurban Railway, Des Moines, Iowa, will in the future be known as the Des Moines & Central Iowa Company. This action was taken at the recent annual meeting of the road and is the result of a desire to give the road a name which would be more distinctive. The plan has been under consideration for some time and for several months all passenger cars have borne a legend "The Des Moines and Central Iowa Route."

Reports Surplus of $16,956

The Washington Water Power Company, Spokane, Wash., realized a gross revenue of $4,778,554 for the year ended Dec. 31, 1921. In 1920 this item amounted to $4,604,893. The net income was $2,462,970 against $2,299,737 a year ago. After paying dividends out of the balance of $1,101,256 a surplus remained of $16,956. In 1920 the surplus realized was $5,378. The balance sheet as of Dec. 31 shows cash amounting to $237,139; notes payable $642,669 and total assets and liabilities of $32,244,707.

Balance After Dividends Reduced

The annual report of the Republic Railway & Light Company, New York, N. Y., for the year ended Dec. 31, 1921, shows a balance of $347,992 after taxes, charges, etc., equal to $6.70 per share earned on $5,191,400 preferred stock. The full 6 per cent dividend was earned notwithstanding a material increase in the fixed charges due to the cost of refinancing maturing obligations at a higher rate of interest.

Details of the income account for the year compared with 1920 are shown in the following table:

	1921	1920
Gross earnings	$7,321,679	$8,420,366
Operating expenses and taxes	5,391,369	6,556,393
	$1,930,310	$1,663,993
Other income	372,378	156,219
	$2,302,688	$2,020,212
Interest and discount	1,520,361	1,228,976
Surplus	$782,387	$791,235
Balance after preferred dividends of subsidiary companies	$347,992	$431,172

While gross earnings decreased 13.04 per cent due to depression in industry, such substantial economies were effected that operating expenses were reduced 17.77 per cent, so that net income available for fixed charges increased 13.93 per cent.

During the year subsidiaries sold $750,000 of 8 per cent gold notes and $750,000 of 8 per cent preferred stock. The preferred stock was sold largely to customers and employees. At the present time 67½ per cent of the employees are stockholders.

More than one-half of the gross earnings were derived from lighting and power. On Dec. 31, 1921, there were 42,629 power and light customers, a net increase of 12 per cent for the year.

On Oct. 1 the company introduced on the lines it controls in Youngstown a weekly pass sold for $1.25 which has been a substantial success, gross earnings from railway having materially increased and competition from jitneys reduced.

Financial News Notes

Will Increase Capital Stock.—The Wichita Falls (Tex.) Electric Company, which owns and operates the railway in that city, has filed an amendment to its charter increasing the capital stock from $1,775,000 to $2,275,000.

Dividend Increased. — The United Power & Transportation Company, Camden, N. J., has declared a dividend of $1.85 per share payable Jan. 31. This compares with $1.60 a share the last previous dividend.

Seeks Discontinuance. — A petition has been filed with the Illinois Commerce Commission by F. W. Rekman, receiver of the Joliet & Eastern Traction Company, Joliet, Ill., seeking permission to discontinue operation of the line. The receiver says that the company is financially unable to continue business.

Directors Re-Elected.—Stockholders and directors of the Texas Electric Railway, at their annual meeting in Dallas, Tex., recently re-elected Jack Beall of Dallas as president, re-elected members of the board of directors and transacted other business. The annual report of Mr. Beall as president of the company was presented and approved.

Winnipeg Reports Net of $649,420.—For the eleven months ended Nov. 30, 1921, the Winnipeg (Man.) Electric Railway realized a net income of $649,420 against $518,909 for the same period a year ago. The gross earnings amounted to $5,032,069 for the eleven months' period of this year and the expenses including taxes amounted to $3,732,099.

Reports Wanted for Assessment Purposes.—Public utilities of Oklahoma, including electric interurban lines and street railway systems, are being notified by Frank Carter, state auditor, that reports of their operations, for assessment purposes, must be in the hands of the auditor before March 1, 1922. It is declared that the schedule of assessments in most cases for 1922 will probably be the same as for 1921.

Surplus of $1,783,437 in Richmond.—For the twelve months ended Dec. 31, 1921, the Virgina Railway & Power Company, Richmond, Va., realized $10,173,334 in gross earnings, with net earnings of $3,105,672. After paying stock dividends on preferred etc., a surplus of $1,783,437 remained. The balance sheet as of Dec. 31, shows cash amounting to $827,649. Total assets and liabilities amount to $48,275,477.

Abandonment Opposed.—The meeting held recently at Rockville, Conn., to consider the discontinuance of the interurban service on the line of the Connecticut Company between that city and Hartford ended without any decision. The project was bitterly opposed by the municipal authorities of Rockville. The abandoning of the line was also opposed by others. There will be another meeting on the matter before any decision is made.

Wants to Abandon Line.—The Pittsburg County Railway, McAlester, Okla., has filed a petition with the State Corporation Commission seeking permission to abandon its line from Osage Avenue to the eastern limits of the city and from that point to the country club. The company claims that if this line is continued it will have to spend about $7,000 for paving and for changes of rails and ties on North Main Street and $18,000 on Seneca Avenue. The application will be heard on Feb. 16.

To Join in Cincinnati Reorganization.—Following an investigation of the motives underlying the proposed reorganization of the Cincinnati (Ohio) Street Railway, members of the board of directors of the Chamber of Commerce have announced that they will appoint a representative of their organization to serve on the special citizens' committee to be appointed by Mayor George P. Carrel. The board of directors had postponed action until further investigation of the underlying motives could be made.

County Commissioners Oppose Abandonment.—The Hamilton County (Ohio) Commissioners have filed a protest with the Public Utilities Commission at Columbus, Ohio, against granting the application of the Interurban Railway & Terminal Company for authority to abandon its New Richmond and Lebanon (Ohio) division. The commissioners contend that the franchise granted by the county to the traction company constitutes a contract and that the commission is without authority to affect it. The interurban company was granted a twenty-five-year franchise in 1901.

Texas Property Submits Reports.—The Texas Electric Railway, Dallas, Tex., has filed with M. G. James, city secretary, its annual financial statement covering operations during the year 1921. The report shows the annual operating cost of the line to be $2,199,929, while the gross earnings amounted to $2,889,838. The value of the "tangible assets" is placed at $8,895,606, of which $211,836 is in cash on hand. The company paid out $115,174 for damage suits, during the year, and spent $114,059 on repairs. The company has outstanding $10,500,000 in capital stock.

Traffic and Transportation

Fare Measure Likely to Go Before Voters

Two measures affecting fares on the Seattle (Wash.) Municipal Railway probably will be submitted to the voters at the city election next May. The two proposals are Councilman Fitzgerald's referendum ordinance, providing for a 5-cent fare, with any deficit charged against the general fund, and Councilman Oliver T. Erickson's initiative ordinance.

The Fitzgerald ordinance provides for a 5-cent fare, with a 2-cent transfer charge, and the deficit made up out of taxation. If passed by the Council and approved by acting Mayor Robert B. Hesketh it will be placed on the spring ballot.

The Erickson scheme, provided in an initiative ordinance for which sufficient signatures have been presented to assure its appearance on the ballot in May, would place all the cost of operation and maintenance of the street railway on the general fund, increasing the tax levy for municipal purposes by something over $5,000,000, or approximately 20 mills. The interest and principal on the $15,000,000 bonds awarded to Stone & Webster interests in payment for the railway, under Erickson's plan, would be paid out of revenues accumulated from a fare which would be sufficient to cover these charges and to set aside out of each fare 1½ cent for extensions and betterments. The interest and principal this year amount to approximately $1,500,000. By this scheme Mr. Erickson asserts the fare would be 3 cents, the deficit to be made up by approximately 20 mills addition to the tax rate.

Ticket Tampering No Longer Tolerated

On Jan. 1, 1922, the British Columbia Electric Railway, Vancouver, B. C., started enforcing the terms of the contract governing the sale and use of fifty-ride tickets on its Central Park interurban line. These tickets are sold on the condition that they must be used within thirty days from date of purchase, that they will not be accepted if detached from the book and that they are not good for other than the holder who is required to sign on the cover. For several years the company did not enforce these rules and gross abuses of the tickets took place. It was found that storekeepers were buying books and reselling them at higher rates than set in the books, that gangs of men were buying books and distributing the tickets, and that various members of a family would use the same book. The company also issues ten-ride books at a slightly higher rate with no time limit and no condition against transference.

The order was accompanied by a change in color of the tickets so that the old tickets automatically became void on Jan. 31. On that date also the thirty-day limit on new tickets expired. There was considerable public opposition to the change. There has been no increase in fares on this line, the fares on fifty-ride books being as low as 1 cent a mile with transfers to Vancouver and New Westminister city lines free. Appeals were made to the Council of the municipality of Burnaby, but that body was unable to take any action as the company was within its contract rights.

Aldermen Don't Expect Lower Fare Propaganda Again

Having rejected the proposal for a lower fare appeal at a recent meeting by a vote of fifteen to five, members of the Board of Aldermen at Hartford, Conn., declare that they do not think the question will come before them again unless at the request of some representative organization such as the Chamber of Commerce. The desire was expressed that an appeal might be taken to the Public Utilities Commission, particularly for the purpose of impressing upon the commission the desirability of having the Hartford division of the Connecticut Company segregated as a fare unit.

The Hartford division is by far the best paying district served by the Connecticut Company as the company's report for 1921 shows. This report indicated that total receipts in Hartford in 1921 were more than $500,000 greater than the preceding year. The Public Utilities Commission has openly announced that large populace centers should not be obliged to pay for remote sections and that the trolley company's system should be divided into accounting districts, each district to comprise such territory and municipalities as are closely connected and are daily dependent in their industrial activities upon intercommunication and transportation.

Relieves Interurban Line From Old Franchise Rates

Negotiations with the village of London, Ohio, have resulted in an amendment to the franchise of The Indiana, Columbus & Eastern Traction Company, permitting substantial increases in rates between London, West Jefferson, Columbus and Springfield. This action was voluntary on the part of the Council of London.

The original franchise rates and the new rates are as follows:

	Single Trip		Round Trip	
From London to	Old	New	Old	New
Columbus	45c	70c	75c	$1.40
West Jefferson ..	20c	35c	35c	70c
Springfield	35c	55c	65c	$1.10

Chicago "L" Begins New Fast Service

Another step toward improving the Chicago elevated service has been accomplished by the Northwestern Elevated Railroad, Chicago. Beginning on Feb. 13, four trains will be operated during the evening rush hour from the loop, without stop, to Loyola station, a distance of approximately 9½ miles. Each of these four trains will be made up of eight cars, six cars having been the standard limit of train length heretofore, and in order to make this possible, it was necessary to lengthen the elevated platforms at the stations used by these trains. The improvement in service is greatly appreciated by the patrons living on the outskirts of Chicago and in Evanston and Wilmette.

These particular trains will be operated around the Loop, instead of coming through from the South Side, making the entire capacity available for northbound Loop passengers. Another innovation is a time card distributed among the elevated patrons. This time card gives the leaving times of these four trains from the various Loop stations. For example, these special trains leave State and Van Buren Streets, on the Loop, daily, at 5:08, 5:21, 5:34 and 5:45. The running time to Loyola Station from Clark and Lake, the last Loop stop, is twenty-eight minutes, giving a rate of speed of approximately 22 m.p.h.

Eight similar through trains southbound in the morning have been operated from Loyola to the first stop on the Loop, without stop, for several weeks past. The leaving times of these trains from the various stations north of Loyola have been given to the patrons. Up to the present time, however, only six-car trains have been operated in this special non-stop service. This service has reduced by five minutes the regular running time between the Loop and Loyola.

Increased Rates Start Bus Agitation

Since the recent increase in interurban fares was granted the Pacific Electric Railway Lines by the California State Railroad Commission, certain outlying suburban communities served by the Pacific Electric have agitated the establishment of municipal bus lines to compete with the interurban line. One of the most active communities in this direction is the suburban town of Glendale, which has a resident population of approximately 25,000, and lies just outside of the city limits of Los Angeles. The distance from the center of the city of Los Angeles to the center of the town of Glendale is 8.4 miles.

The Board of Trustees has started activities towards the establishment of a municipal-owned and operated bus line between its town and Los Angeles to compete with the Pacific Electric Line. It is proposed to submit to the voters there a plan to raise $125,000 to carry out the plan.

Compromise Agreement Fails

City officials of San Antonio, Tex., have been blocked, at least temporarily, in their efforts to stop the operation of jitneys, in compliance with their compromise agreement with officials of the San Antonio Public Service Company. The agreement was that in return for a reduction of fares from 8 cents to 6 cents the city would eliminate jitney competition except to Camp Travis. An ordinance re-routing jitneys so that they would not come in competition with the traction company was drafted and passed by the City Commission, but a temporary injunction granted by Judge Minor of the Fifty-seventh District Court, on application of the jitney drivers, restrained the city from enforcing the re-routing ordinance. At the same time the officials of the traction company announced that they would not observe provisions of the fare ordinance that had been passed to take effect at the same time.

The result was that jitneys after Jan. 31, the date on which the ordinances were to have taken effect, continued to operate as usual and the traction company charged 8 cent fares as usual. Major W. B. Tuttle, general manager of the traction company, announced that his company would continue to charge an 8-cent fare until the city complied with its agreement and the anti-jitney ordinance or a jitney re-routing ordinance actually went into effect.

The city at first sought to prohibit the operation of jitneys outright, but were blocked in this move by the jitney men. Resort was then made to the re-routing ordinance.

Through Service Ends Controversy

Through service on the lines of the Dallas (Tex.) Railway to the Belmont and Vickery additions started Feb. 5. The beginning of through service marked the end of a controversy involving the residents of these two additions, the city officials and officials of the Dallas Railway for more than a year. Formerly a short independent line was operated by the Dallas Standard Traction Company, organized by the real estate firms that opened the two additions. When the additions were settled negotiations were opened for the Dallas Railway to take over the narrow-gage line and operate cars direct from the business district to the new additions. Legal entanglements followed and the matter was fought out in the courts before an agreement was finally reached by which the Dallas Railway took over the lines of the independent company.

Hears Petition for Straight 7-Cent Fare.—The petition of the Tidewater Power Company, Wilmington, N. C., for permission to charge a straight 7-cent fare has been heard by the corporation commission. The company charges 7 cents for straight fares in Wilmington, but sells four tickets for 25 cents or seventeen for $1. A straight 8-cent fare prevails in Raleigh on the company's lines.

"Buy in Indiana"

Interurban Roads Behind Movement to Divert Traffic to Indianapolis as Home Trading Center

The freight and express service offered by the interurban lines centering at Indianapolis, Ind., has probably done more than any other single agency to build up the commercial and jobbing interests of the city, and has been the means of greatly extending the territory from which the city draws trade. This has not always been accomplished simply by making available freight or express service, but through co-operation of the railways with merchants, and in some cases the pioneer work has been carried on by the electric lines themselves.

This was forcibly brought out, interurban officials say, by the party of 150 merchants, bankers and business men which came to Indianapolis a couple of weeks ago under the personal direction of J. C. Schade, general manager of the Winona Interurban Railroad, operating 70 miles of the line running north and south from Goshen to Peru, and connecting with the Union Traction lines at the latter point. A commercial and industrial survey made several months ago by Mr. Schade, covering the towns on his line, developed that merchants were buying their goods from jobbers and wholesalers in Chicago, Toledo, Cleveland, etc., and other cities, and that salesmen from those centers were visiting the territory regularly. Five East and West steam lines also serve this district, which probably largely accounts for their activities. It was also found that as a result banks were carrying 90 per cent of their exchange balances in those cities.

Towns on the Winona Interurban lines are approximately the same distance from Chicago as from Indianapolis, with the advantage in favor of the latter from the jobbers' or wholesalers' standpoint, due to the fact that overnight delivery of shipments is made via electric lines from Indianapolis, while deliveries from Chicago and other points mentioned take from two to five days.

As a result of this survey and its developments, a compaign of education was started in the towns on the line through Chambers of Commerce and other civic bodies, having as its slogan, "Buy in Indiana." The logic of this was quickly realized when it was made plain that several million dollars went from the State annually to promote business in other States, which might be better kept at home, particularly as the Indianapolis market offered equal or better values and inducements. Bankers also agreed to co-operate by increasing their balances in Indianapolis banks, and the trade excursion to promote acquaintance and friendship was the result. One town sent thirty representatives, one from each industry.

Judge Comments on Fare Situation

In a statement made recently by Judge J. T. Ronald of the Superior Court in Seattle, Wash., the opinion was expressed that if any citizen legally protests, no measure reducing the fare on the Seattle Municipal Railway below the present 8⅓-cent schedule can be carried out even if voted by the people at the polls. Judge Ronald emphasized, however, that his comments were those of a private citizen and were not made in an official capacity. Recently, in deciding the suit of the fourteen taxpayers to restrain the city from invading the general fund to pay for the railway lines, Judge Ronald held that the general fund might be drawn upon for operation only, but that such action could not be taken at this time because the tax levy for 1922 had been made. The judge made these two points:

1. Inasmuch as the city of Seattle already is levying taxes at a rate higher than that authorized by charter, any increase in the tax rate, whether for railway or other purposes, could be enjoined by application of one taxpayer.
2. That the city's undisputed testimony in the fourteen taxpayers' suit was that any reduction from the 8⅓-cent fare would force an invasion of the general fund in order to maintain the railway system.

For these reasons Judge Ronald said the city is facing a grave situation. He declared there is no doubt, if a lower fare is voted by the people, the City Council would immediately put it into effect. This, according to the testimony of the city's witnesses, would mean a deficit which could not be met if any taxpayer appealed to the courts. In his recent decision in the suit of the fourteen taxpayers, Judge Ronald held that inasmuch as the general fund levy is now beyond the limit prescribed by charter, no funds could be transferred from it for the aid of the railway or any other purpose.

Continuance of Higher Fare Refused

An 8-cent cash fare with books of twenty-five tickets at 6 cents a ticket will go into effect on the lines of the City Light & Traction Company, Sedalia, Mo., on March 1. This order was handed down by the Public Service Commission on Jan. 31.

Since August, 1921, the rate of fare has been 10 cents cash with a 6-cent ticket fare. This ruling was authorized for six months. A few days before the expiration of the 10-cent fare the company filed an application with the commission for a continuance of these rates.

The opinion of the commission states that the 10-cent rate is too high and is keeping the company from securing the business it is entitled to. The new order is for a period of thirteen months, and states that adult cash fares shall be 8 cents; children's cash fares 4 cents; two adult fares to be sold on the cars for 15 cents; or a token returned for a second fare, by a passenger paying 15 cents.

Transportation News Notes

Ticket Plan Will Cut Fares.—The Salem & Pennsgrove Traction Company, Pennsgrove, N. J., will soon put into effect a strip ticket plan which will mean a slight reduction in fare for regular riders.

Interurban Wants Fare Provision Waived.—At Bucyrus, Ohio, the Crawford County Commissioners have been ask by F. H. Wilson, receiver of the Cleveland Southwestern & Columbus Railway, to annul the franchise granted in 1897, so that the road may apply to the authorities for an increase in passenger rates, understood to be 3 cents a mile.

Traffic Court Soon to Be Established. According to a recent statement of Traffic Commissioner Marshall of Pittsburgh, Pa., a traffic court will be established shortly in the city. Mr. Marshall made this statement at a meeting of the Safe Drivers' Club in commenting on conditions in the city. Prominent city officials were present at the meeting and indorsed the program for safe driving.

45,493,064 Passengers Carried.—The Memphis (Tenn.) Street Railway during the year 1921 carried 45,493,064 revenue passengers. This number is 4,579,505 less than the estimate made by the company. Revenue for the year amounted to $3,181,245, which is $307,643 less than the estimated amount. The company reports a deficit of $90,584 for the year. A total of 7,590,981 car-miles was traveled during this period.

Seeks Restoration of Five-Cent Fare.—Mayor Curley in his inaugural address said that legislation for the restoration of the 5-cent fare for street car rides within the city limits will be sought at once. The unit fare at present is 10 cents, with some short hauls on the 5-cent basis. The Legislature is asked by him to cease "undue unwarranted an unwelcome interference with Boston in the conduct of its own business."

Southern Pacific Electrification Unlikely.—Julius Kruttschnitt, chairman of the board of directors of the Southern Pacific, stated recently that electrification of the lines of the Southern Pacific down the peninsula from San Francisco could not be planned at the present time. The electric lines in the district of San Francisco Bay have not paid operating expenses, he said, and the company was not expecting to extend its electric transportation services.

Improvement in Service Noted.—Improvement in the electric railway service and a decrease in the number of accidents have resulted on the lines of the Dallas (Tex.) Railway as a result of the new system of grading trainmen, according to George I. Plummer, superintendent of traffic. Trainmen are graded on attention to duty, courtesy, signals and care of cars. Carelessness in operating doors was the greatest cause for complaints during 1921, Mr. Plummer says. During December, nineteen collisions with automobiles were reported.

Reduce Fares 10 and 25 Per Cent.—Fares on the city lines in New Castle and Sharon, Pa., of the Pennsylvania-Ohio Electric Company were ordered to be 10 cents cash or eight tickets for 50 cents. This means a ticket reduction for most riders in New Castle of 10 per cent and for those in Sharon of 25 per cent, since tickets are now sold on the cars. The rate in New Castle was formerly 7 cents cash with few tickets sold at six for 40 cents. In Sharon the rate was 10 cents cash, with tickets at 8⅓ cents.

Hearing on Injunction Postponed.—Hearing of the injunction suit against the city of Louisville, Ky., preventing it from interfering with the Louisville Railway in collecting a 7-cent fare, was to have taken place on Feb. 8, but on Feb. 7 was postponed a week due to illness of attorneys for both the city and company. The case is before the Circuit Court of Appeals, Cincinnati, having been turned back to that court by the United States Supreme Court. However, it is doubtful whether it will be heard before some time in March.

Installs "Pay-Within" Cars.—The Birmingham Railway, Light & Power Company, Birmingham, Ala., has installed ten steel "pay-within" cars on its North and South Highland lines. The company recently put on a number of safety cars on its other lines. Passengers were informed of the change in manner of alighting from and boarding cars by means of car cards and newspaper advertisements. A full-page display in the daily paper carried pictures of the cars and the new type of entrance and exit.

8-Cent Token Buys Ride in Danbury.—Though cash fares remain at 10 cents on lines of the Danbury & Bethel Street Railway, Danbury, Conn., twenty-five tokens will be sold for $2. These tokens will be good at any time and for one continuous passage. The company previously sold 8-cent tickets in groups of twenty-five, but these were good only between 6 a.m. and 6 p.m. and within the city limits of Danbury. The tokens will include privilege of transfer. Judge Ives, receiver for the company, said that to return now to the 5-cent fare would be folly for that railway.

Will Support 10-Cent Rate.—The citizens' trolley committee of Pittsfield, Mass., has informed the Berkshire Street Railway that it will support the company in a plan to establish a flat 10-cent fare in place of the present zone system with a 6-cent charge in each zone, running to 18 cents in some instances for rides between different points in the city. A condition named by the committee is that the proposed rate be given a sixty days' trial. The Pittsfield-Dalton line, as well as those within the city of Pittsfield, is included in the proposal which may be put before the Public Utilities Commission.

Tokens in Readiness.—Approximately 80,000 tokens have been received at the offices of the Connecticut Company at Hartford, Conn., in readiness for the coming three-for-a-quarter schedule of fares that will go into effect on March 1. For all the cities in the State where the Connecticut Company operates 500,000 of the tokens will be distributed for sale. The tokens are being tied in lots of a dollar and larger amounts. No announcement is made as yet when the sale of the tokens will start, but it is probable that they will be ready for the public about a week before the new fare schedule goes into effect.

To Sell Tickets on all Cars.—For the convenience of the traveling public, the New Jersey & Pennsylvania Traction Company, Trenton, N. J., has been recommended by the State Board of Public Utility Commissioners to supply conductors on its Trenton-Princeton division with tickets selling at the rate of four for 30 cents. The utility board on Sept. 28 last permitted an 8-cent fare, with four tickets for 30 cents. The company, however, sold the tickets only at the terminus on West Hanover Street. The board says these tickets are for the benefit of the riding public and must be sold on cars. The order will become effective on Feb. 21.

Eat While You Fly.—A typical newsboy in white cap and uniform, the type that is found walking through the coaches of a fast Pullman train crying his wares for sale, which include magazines, books, candy, cigarettes, cigars, sandwiches and waffles, has been placed on the Wabash Valley Flyer by the Indiana Service Corporation which operates the fast interurban electric service between Lima, Ohio, Fort Wayne and Indianapolis, Ind. This extra service feature has been added for the particular convenience of travelers who leave Lima at 3 o'clock in the afternoon and arrive in Fort Wayne at 5:10 o'clock en route to Indianapolis. The wait at Fort Wayne is only ten minutes, which hardly allows time for passengers to get out and secure supper.

33,572,961 Passengers in New Jersey in January.—Under the provision of an order of the United States District Court in proceedings to establish valuation and rate of fare charged the Public Service Railway, Newark, N. J., has filed with the court a statement showing that 33,572,961 passengers were carried by the railway during the month of January. While this is below the figure for December, as was to be expected because of the holiday travel, it exceeds by 1,730,644 the number of passengers carried in November. For the first time since the new fare went into effect, a larger number of passengers used tokens, sold at four for 30 cents, than paid the 8-cent cash fare.

Personal Mention

Mr. Rainsford's New Work Includes All the Engineering Arts

As Chief Engineer of the Philadelphia Company He Supervises Many Subsidiaries

Casting its weather-eye about for a man who ably combines all the special qualities of a trained engineer and the general qualities of efficient business man and organizer, the Philadelphia Company saw Ralph Rainsford and thereupon chose him for chief engineer. He thus holds a very important executive position with the company, which controls practically all of the public utilities of Pittsburgh and its surrounding territory, including the Duquesne Light Company, Equitable Gas Company and Pittsburgh Railways, and the subsidiaries such as the Harwick Coal & Coke Company, Cheswick & Harmar Railroad, Equitable Auto Company, Equitable Sales Company, and Equitable Real Estate Company.

RALPH RAINSFORD

Mr. Rainsford, who has just assumed his new duties as chief engineer of the Philadelphia Company, is frank to admit that this post requires that its incumbent know a great deal more than is possible for one human being to know. He turns the trick, however, by having in his department specialists in each of the arts of engineering represented in the diffierent companies of the Philadelphia organization, and by being himself the hub of this information.

It is this centralizing sort of thing which Mr. Rainsford did during the war, when as Captain in the Signal Corps, Aviation Section, he was district manager of inspection for all material produced in the Atlantic states for the air service, Signal Corps, and miscellaneous departments including foreign missions. Since no organization existed to cover this work, Mr. Rainsford built one up, and prepared for training, housing and equipping the force, which constantly increased in size.

His position with the Philadelphia Company, and his work in the army are the culmination of excellent training and experience coupled with his unusual ability for efficient organization. Mr. Rainsford was graduated from Harvard University, in both the academic and scientific schools, in the class of 1902, possessing at the end of this training, he said, "honors in graduation, two degrees, a scholarship, much athletic experience, $100 and a railway ticket to Colorado."

EMPLOYED BY BANKING GROUP

During two years in the western states he gained practical experience as a laborer and foreman, then came to the attention of John Hays Hammond, at that time general manager for the Guggenheim Exploration Company. For four years thereafter he worked for these interests, including the American Smelting & Refining Company. Later he represented a New York banking group of wide interests and was engineer and manager of the company's properties in the West for six years. At the request of the company he was transferred to the General Motors Company, in which the concern was interested. He later joined the J. G. White organization as engineer, and after his service in the army returned to this company.

Leake Carraway Dead

Leake Carraway, formerly local director of public relations for the Virginia Railway & Power Company at Norfolk, Va., died on Feb. 10. Mr. Carraway went to Norfolk in June, 1919, from Charlotte, N. C., where he had been employed as executive secretary of the Chamber of Commerce and later as director of publicity of the Southern Public Utilities Company. Mr. Carraway was born forty-nine years ago at Wadesboro, N. C. He entered newspaper work in 1900 at Little Rock, Ark., as a reporter on the staff of the *Arkansas Democrat* and seven years later was appointed managing editor. He was also managing editor of the *Arkansas Gazette* at Little Rock.

In 1911 and 1912 Mr. Carraway was executive secretary of the Charlotte, N. C., Chamber of Commerce, resigning that position to serve with the Southern Public Utilities Company. He was known to public utility men the country over, having served as chairman of publicity men of the American Electric Railway Association, as chairman of the publicity committee of the Southern Gas Association and as a member of the managing committee of the advertising section of the American Gas Association.

George L. Radcliffe

More Than Thirty Years Spent by Mr. Radcliffe in Service of Cleveland Railway

Funeral services for George L. Radcliffe, vice-president and general manager of the Cleveland (Ohio) Railway, who died on Feb. 9, were held on Feb. 11, from the Epworth Euclid Memorial Church in Cleveland.

Mr. Radcliffe, who was fifty-two years old at the time of his death, had been engaged in electric railway work for thirty-three years. He worked his way up from the post of conductor to second in command of one of the largest traction companies in the United States. He was widely known to electric railway men in all parts of the country, having in addition to his position in Cleveland, held important traction posts in Detroit, Mich., and Schenectady and Utica, N. Y.

Mr. Radcliffe was born in Cleveland, May 25, 1869. He went to work for the old Broadway & Newburgh Street Railway in 1889 as conductor, after having been graduated from the grammar and high schools in Cleveland. Shortly afterward he became cashier at the Aetna Road station of the company and upon the formation of the Cleveland Electric Railway in 1893 he was appointed general superintendent. In 1899 he resigned this position to identify himself with the Detroit United Railway.

GEORGE L. RADCLIFFE

Upon the resumption of the control of the Cleveland Railway by the Stanley-Andrews interests in 1902, he returned to Cleveland as general superintendent and remained in that capacity until 1908, when he went to the Schenectady lines as superintendent. In 1910 at the beginning of the operation of the Cleveland Company under the Tayler service-at-cost franchise, he again became general superintendent of the Cleveland lines.

In January, 1913, Mr. Radcliffe became general manager of the Cleveland traction company and on Dec. 23, 1916, he was elected vice-president and a director in the Cleveland Railway. He was identified with the Cleveland Railway in the three capacities—as vice-president, general manager and director—at the time of his death.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Recommends the Purchase of Light-Weight Cars

In replying to recommendations of Peter Witt made with respect to changes in the operation of the Seattle (Wash.) Municipal Railways, D. W. Henderson, general superintendent of the line, said that his department would recommend the purchasing by the city as soon as possible of at least 200 light weight double truck cars which should be built so as to be operated by one or two men as conditions require. Mr. Henderson said that his department believed that if the City Council and those who have the power could get in touch with some of the manufacturers of the country, possibly these cars could be purchased by paying a very small initial payment to start with and the balance could be paid from the net saving which there would be in the operation of these light weight cars. He said further that there would be a considerable saving of power, and considerable saving in the maintenance of equipment for the first five years at least, also a great saving in the maintenance of the track. These suggestions of Mr. Henderson have not yet been acted upon by the city utilities committee of the Council, to which they were referred.

$163,399 Profit for Brill in 1921

For the year 1921 the combined output of the four plants of the J. G. Brill Company amounted in sales value to $7,647,898. The combined output of the company's plants for each of the past six years follows: 1916, $6,180,895; 1917, $7,706,099; 1918, $16,761,154; 1919, $14,210,622; 1920, $17,537,293; 1921, $7,647,898.

After deducting from earnings the sum of $370,453 for depreciation and the cost of all maintenance and repairs for the year, and after charging against earnings and reserves, set aside for this purpose, the sum of $325,915 to cover depreciation in inventory values, the result, combined for the year, of the operation of all the plants shows a profit of $163,399.

It is explained by the company that while it has been doing business in Canada for many years, it seemed desirable to extend its operations in that territory, and for this purpose a new company was formed known as Canadian Brill Company, Ltd., all the stock of which is owned by the American company, except the directors' qualifying shares. The new company has leased, with an option to purchase, a moderate size plant at Preston, Ont., which was put in operation on Sept. 1, 1921, and now has sufficient work to keep it running at its full capacity.

Early in the year the company, jointly with the General Electric Company and the Westinghouse Electric & Manufacturing Company, organized the Electric Railway Equipment Securities Corporation, with an authorized capital of $1,000,000, all the stock, except directors' qualifying shares, being owned by these companies. The object in organizing this company was to provide a convenient means for disposing of car trust notes that the company considered advisable to take in partial payment for such cars as it desired to sell under a deferred payment plan. The Electric Railway Equipment Securities Corporation purchases from the Brill Company, without recourse, car trust notes which that company receives for cars, including electrical apparatus, sold under this plan, and either holds them or disposes of them to bankers to be sold to the public. It is explained that this financing company has been operating most successfully.

With respect to the future the company says that the business depression during the year is reflected in the decreased combined output of its plants, and while the company enters the year with a comparatively small amount of work on hand, there has been great improvement since the first of the year in inquiries received and in the prospects for business which should be placed during the current year.

The Break in the Crude Rubber Market

One of the outstanding developments of the last two weeks has been the phenomenal break in the crude rubber market. The price of spot smoked sheets dropped from 21 cents a pound to less than 16 cents. This is only 6 cents above the record low price of 1920 and is the lowest price quoted since last summer. Those familiar with the trade attribute the break to the forced selling by the large London interests. Furthermore the imports increased considerably toward the end of the year.

On Feb. 2 plantation first latex crêpe was quoted at 15½ cents and smoked rib sheets at 15¾ cents.

New Trade Directory

A new directory of firms whose trade touches either the United States, South America or Germany is to be issued shortly as Guia Aleman Americana by the Caxton Translations Institute of 47 Victoria Street, London, S. W. 1, England, and whose agents in New York are the Ford Corporation of 97 Broadway.

The directory will be in three languages, English, Spanish and German, and will embody 45,000 names of firms which have business dealings in any of the three countries. The three-language arrangement is so that the book will be equally useful whether the user speaks Spanish, German or English, and the descriptions on each page and in each section will be given in the three languages. A cross-index is to be included to give ready reference to the trade names of all the goods included in the directory.

57,000,000 Francs for Swiss Electrification

Fifty-seven million francs have been credited in the Swiss budget of 1922 for electrification of the Federal railways, according to a report to the Department of Commerce from Consul Haynes at Berne. Electrification of the Bellinzona-Lugano-Chiasso, the Erstfeld-Lucerne, and the Goldau-Zug lines will probably shortly be completed. The Amsteg power station, of 80,000 horsepower, will be ready to furnish energy about April, 1922, and the Lucerne-Zug-Zurich line will probably be electrified by the end of the year. The St. Gothard and the Sion-Lausanne line are to be electrified, and will be opened in the summer of 1923. The current will be supplied by the 60,000 hp. Barberine station, which by that time will have been completed.

E. B. Merriam to Direct Switchboard Engineering

E. B. Merriam, formerly director of industrial relations for the General Electric Company, Schenectady, N. Y., has been appointed executive engineer of the switchboard department for this company. As executive engineer he will direct and co-ordinate the engineering activities of the switchboard departments at Schenectady, Philadelphia and Baltimore. Mr. Merriam entered the employ of the General Electric Company in 1900 and for fourteen years was connected with the testing and switchboard engineering departments. About 1917 he became interested in employment problems and was appointed employment manager and director of industrial relations. During the war he served on various personnel classification committees and was industrial representative in military camps for determining occupational rating during demobilization.

Metal, Coal and Material Prices

Metals—New York	Feb. 14, 1922
Copper, electrolytic, cents per lb.	13.187
Copper wire base, cents per lb.	14.625
Lead, cents per lb.	4.70
Zinc, cents per lb.	4.83
Tin Straits, cents per lb.	31.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.775
Somerset mine run, Boston, net tons	1.875
Pittsburgh, mine run, Pittsburgh, net tons	2.15
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.75
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y. cents per lb.	6.00
Weatherproof wire base, N. Y., cents per lb.	15.75
Cement, Chicago net prices, without bags	1.97
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	84.00
White lead, (100-lb. keg), N. Y., cents per lb.	12.25
Turpentine (bbl. lots), N.Y., cents per gal.	90.00

Rolling Stock

Dayton (Ohio) Street Railway has placed an order for fifteen single-end standard safety cars with the National Safety Car & Equipment Company of St. Louis Mo. The cars will be built at the plant of the Cincinnati Car Company, and will be equipped with two General Electric 264 motors and safety air equipment.

Los Angeles (Cal.) Railway has recently developed a new type of car designed for service on the lines of heaviest traffic. Twenty-five of these steel cars have been built by the St. Louis Car Company and furnished with the electrical equipment of the Westinghouse Electric & Manufacturing Company. The new cars are 48 ft. long, weigh 38,000 lb. completely equipped, and will seat fifty-two passengers. Westinghouse type HL multiple-unit control permits the operation of two or more motor cars in a single train. Two Westinghouse type 526-L motors are provided for each car. These motors are rated at 50 hp. each and have capacity and speed to maintain fast schedules. In addition to the motor equipment for the new cars, 150 type 526-L motors have been purchased to be used in retiring motors of obsolete types that have been in service in Los Angeles for many years and are no longer capable of carrying their full share of the burden in transportation service.

Track and Roadway

Chicoutimi, Que.—Plans are drawn for an electric railroad for the San Tonio Railroad. The cost is estimated at $125,000.

Wichita Falls (Tex.) Electric Company, in line with its plan to increase its capital stock, will make extensions and install new equipment.

Dallas (Tex.) Railway has available between $125,000 and $150,000 for extensions during 1922. The program includes the construction of a line on Lindsley Avenue and one on Haskell Avenue.

The Brooklyn (N. Y.) Surface Lines are contemplating an expenditure of about $1,500,000 on reconstruction of tracks this year. This will include work on the tracks of the Nassau Electric, the Brooklyn, Queens County & Suburban, the Coney Island & Brooklyn, and the Brooklyn City Railroad Companies. Prices are also to be taken on a large amount of special trackwork renewals for the season.

Eastern Texas Electric Company, Beaumont, Tex., is considering the extension of the interurban line that it now operates between Beaumont and Port Arthur, Tex., to Port Neches, a new town being developed in the Neches River midway between the two cities. Col. A. E. Humphreys, Texas oil man, who made a fortune in the Mexia oil field, will build a large refinery at Port Neches, and it is believed that the proposed expension of the interurban line to serve that port will be made.

The Municipal Railway of San Francisco, Cal., has 2½ miles of new track extensions under way. The Taraval Street line has 0.88 mile and the Masonic Avenue line 1.57 miles of double track. The Duboce Avenue route, recommended by the city engineer, will have approximately 4½ miles of double track, of which 4,200 ft. will be in tunnel. Decision as to route to be followed in the proposed Sunset and Ocean View extensions has not yet been reached.

Power Houses, Shops and Buildings

International Railway, Buffalo, N. Y., has acquired property on the Terrace and is altering the structure to provide terminals for the Buffalo-Lockport, Buffalo-Olcott, Buffalo-Niagara Falls, Buffalo - Lancaster - Depew Interurban lines. For years the International company has used downtown streets for parking interurban cars, but the new city administration has ordered the discontinuance of this practice.

Portland Railway, Light & Power Company, Portland, Ore., will shortly develop a hydro-electric power station at Oak Grove, which when finished will have two storage reservoirs with a combined capacity of 92,000 acre-ft. The plant will ultimately be developed to 80,000 hp.; 27,000 hp. will be completed the summer of 1924. The construction of the road to the proposed power house will be finished this year.

Interstate Public Service Company has begun the construction of a high-tension transmission system from Reddington, Ind., to North Vernon. It will be connected with the line that extends from Louisville to Indianapolis. The North Vernon Electric Light Company will buy electric power from the Interstate company. Another system is being built from Mineral Springs to Elizabethtown, in Bartholomew county, and will supply electric energy for many farm homes.

Trade Notes

Damon-Chapman Company, Rochester, N. Y., has announced that D. Baldwin Sanneman has joined its staff as general sales manager with headquarters in New York. Mr. Sanneman has been connected with the Perey Manufacturing Company for the past twelve years, and also was connected with the United Railways of Baltimore at one time.

H. A. Brinkerhoff, who for twenty-five years has held important engineering positions with Westinghouse, Church, Kerr & Company, and the succeeding company of Dwight P. Robinson & Company, has resigned. He will organize, in conjunction with R. W. Stovel, the consulting engineering firm of Stovel & Brinkerhoff. They will specialize on design, construction and equipment of electric power stations, factories and railroad shops. The offices of the firm will be at 136 Liberty Street, New York, N. Y.

A. B. Cole, for many years connected with the Westinghouse Electric & Manufacturing Company's publicity department, is now associated with the Wynkoop-Hallenbeck-Crawford Company. He will head the department of transportation publicity of this large printing house. The department writes literature to develop traffic of railway and steamship companies. The experience of Mr. Cole in transportation, industrial and international publicity will be valuable in this connection. His headquarters will be in New York.

Bemis Car Truck Company, Springfield, Mass., has appointed the Economy Electric Devices Company as its district representative in the states of Ohio, Indiana, Kentucky, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas and Nebraska. The very complete line of Bemis specialties includes case-hardened pins and bushings, wearing plates for bolsters and journal boxes, heat-treated motor bolts and manganese steel brakeshoe heads and center bearing plates.

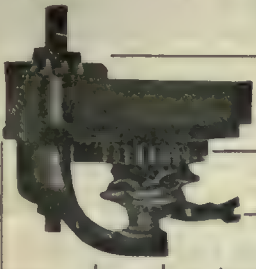
New Advertising Literature

Electric Service Supplies Company, Philadelphia, Pa., is distributing bulletin No. 183 on lightning arresters. This contains sixty-two pages of material describing "Keystone" expulsion type and "Garton-Daniels" lightning arresters for central station, line, transformer, railway and mine protection.

E. P. Seymour Portable Rail Grinder Company has issued a new catalog descriptive of the Midget rail grinder. This contains information regarding details of construction, uses, instructions for operating and a detailed list of the spare parts.

Dwight P. Robinson & Company, Inc., has issued a folder giving a list with brief comments on design, construction and equipping of shops and industrial plants recently done by them. Several electric railway shops and manufacturers of equipment are included.

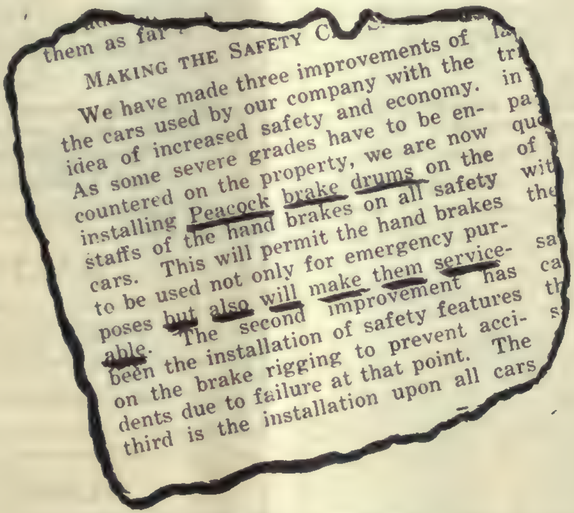
Quigley Furnace Specialties Company, 26 Cortlandt Street, New York, has compiled a new bulletin entitled "Hytempite in the Power Plant." In this bulletin information with illustrations is presented regarding refractory linings and the use of "Hytempite" in power plant work, as well as its uses in connection with "Carbosand" for baffles, patching boiler settings, etc. Some information is included on the uses of "Insulbrix," giving comparative heat losses of uninsulated and insulated walls.



—more about

PEACOCK BRAKES

Read what Clinton D. Smith, General Superintendent of the Pennsylvania-Ohio Electric Company, recently said before the Pennsylvania Street Railway Association:



them as far

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We have made three improvements of the cars used by our company with the idea of increased safety and economy. As some severe grades have to be encountered on the property, we are now installing Peacock brake drums on the staffs of the hand brakes on all safety cars. This will permit the hand brakes to be used not only for emergency purposes but also will make them serviceable. The second improvement has been the installation of safety features on the brake rigging to prevent accidents due to failure at that point. The third is the installation upon all cars

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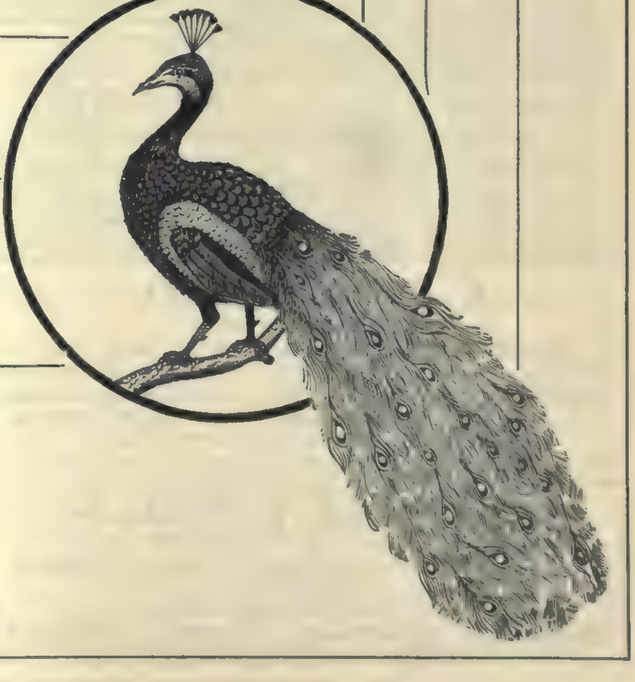

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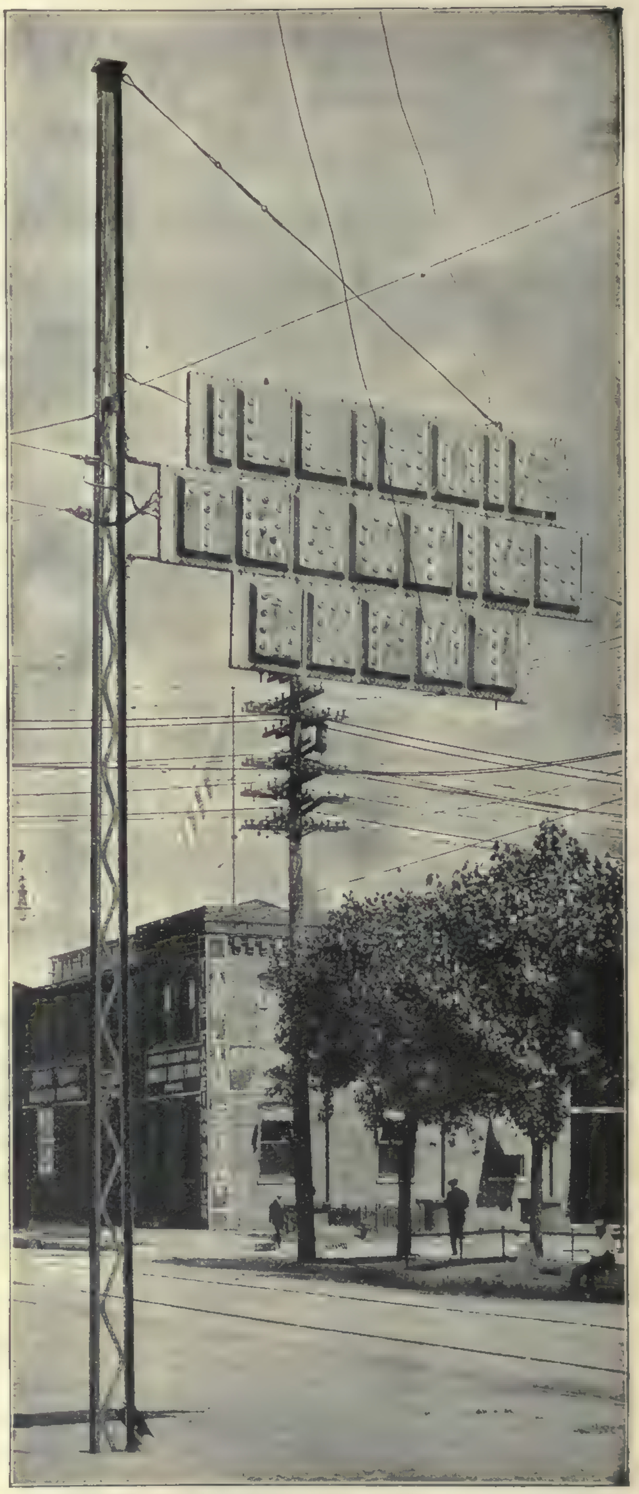

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Bus Transportation
A transportation, engineering and business paper of the passenger bus industry—including automotive buses, trackless trolleys and any other self-propelled buses. It covers managerial, organization, operating and maintenance problems, complete news of the industry and details of equipment.

Chemical and Metallurgical Engineering
Exponent of the fundamental engineering principles on which the chemical, metallurgical and applied industries are based. The scope of its editorials and articles may be summarized as the engineering, technology and economics of those industries.

Coal Age
Devoted to the mining and marketing of coal. Presents new methods, new equipment, new construction; current news, production statistics and market data.

Electrical Merchandising
The monthly magazine of the electrical trade. It gathers from the field new selling ideas and effective commercial and financial methods and disseminates these facts among those who sell, manage and finance electrical appliances, equipment, supplies or service.

Electric Railway Journal
The engineering and busines newspaper of the electric railway industry. It thoroughly covers corporate policies, construction, managerial, operating and maintenance methods, legal and financial news, equipment and supplies and all phases of public relations.

Electrical Review and Industrial Engineer
Devoted to the problems of electric operation and maintenance in mills and factories, particularly from the standpoint of the man responsible for the proper inspection, operation and maintenance of electrical equipment.

Electrical World
Presents the latest authoritative information on the activities of the central station, the industrial electrical engineer, and on the scientific, manufacturing and commercial fields of electricity.

Engineering and Mining Journal
Recognized as the standard authority on metal mining, milling, refining and on the mineral industries. Reports on methods, processes and improved equipment used in the leading mines, mills and smelters. Gives authoritative summaries of market conditions and prices.

Engineering News-Record
Records the intimate technical details concerning notable operations, keeps its readers abreast of current engineering and construction practice, and reports promptly and accurately the civil engineering and construction news of the day.

Ingenieria Internacional
Presents the latest information on the current achievements, practices, equipment and apparatus of the five major branches of engineering in all parts of the world, with special reference to their application and use in the Spanish-reading countries.

Journal of Electricity and Western Industry
Reports Western events, advocating economy, efficiency and convenience of electric power for all industries of the West, manufacturing, agricultural, mining, merchandising and home-building.

Power
It reports every phase of the progress in the generation and transmission within the power plant—including steam, oil gas and water-power prime movers, and electrical, refrigerating, ventilating, pump and elevator auxiliary equipment.

Babson says:

> "Every year has its opportunities. Great fortunes are made during periods of depression as well as during periods of prosperity. They, however, are made by different groups of people and in different ways. 1922 will offer wonderful opportunities, but they must be sought for. They will be found by the engineer rather than by the promoter, by the thrifty banker rather than by the speculator, and by the man who creates and upbuilds rather than by the middle-man or trader."

1922 OFFERS REAL OPPORTUNITIES to you and to everyone who will adjust himself and his business to the new conditions.

THE PERIOD WE HAVE ENTERED is the time of all times for the man who "knows his business," who is abreast of the times, who is constantly and accurately informed on all the vital problems affecting his industry.

BUT THE JOB IS TOO BIG and the pace is too fast for anyone to "go it alone." He must keep in touch with the constructive opinion of those who are continually interpreting events in terms bearing upon his particular industry. He must give heed to the collective thought of those whose foresight offers a guide to paths of future progress.

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Every Electric Railway that we supply is assured of individual, concentrated service

Universal Lubricating Service is a practical service by men who will *personally* take up your lubricating problems—make installations of tests and *show results* which will be satisfactory and economical.

We will be glad to show you what TULC and Universal Lubricating Service can do on your lines in the lubrication of electric railway equipment.

Give it a thorough trial under the most severe conditions. You cannot lose—for if the results are not what we claim, we do not expect pay for the test. One company that accepted this offer cut the cost of oiling from 86 cents per thousand miles to 42 cents per thousand miles.

Don't take our word for TULC—let us show you.

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—show you how and why Tulc should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

***The* Universal Lubricating Co.**

Offices: Schofield Bldg. **Works: Sweeney Ave.**
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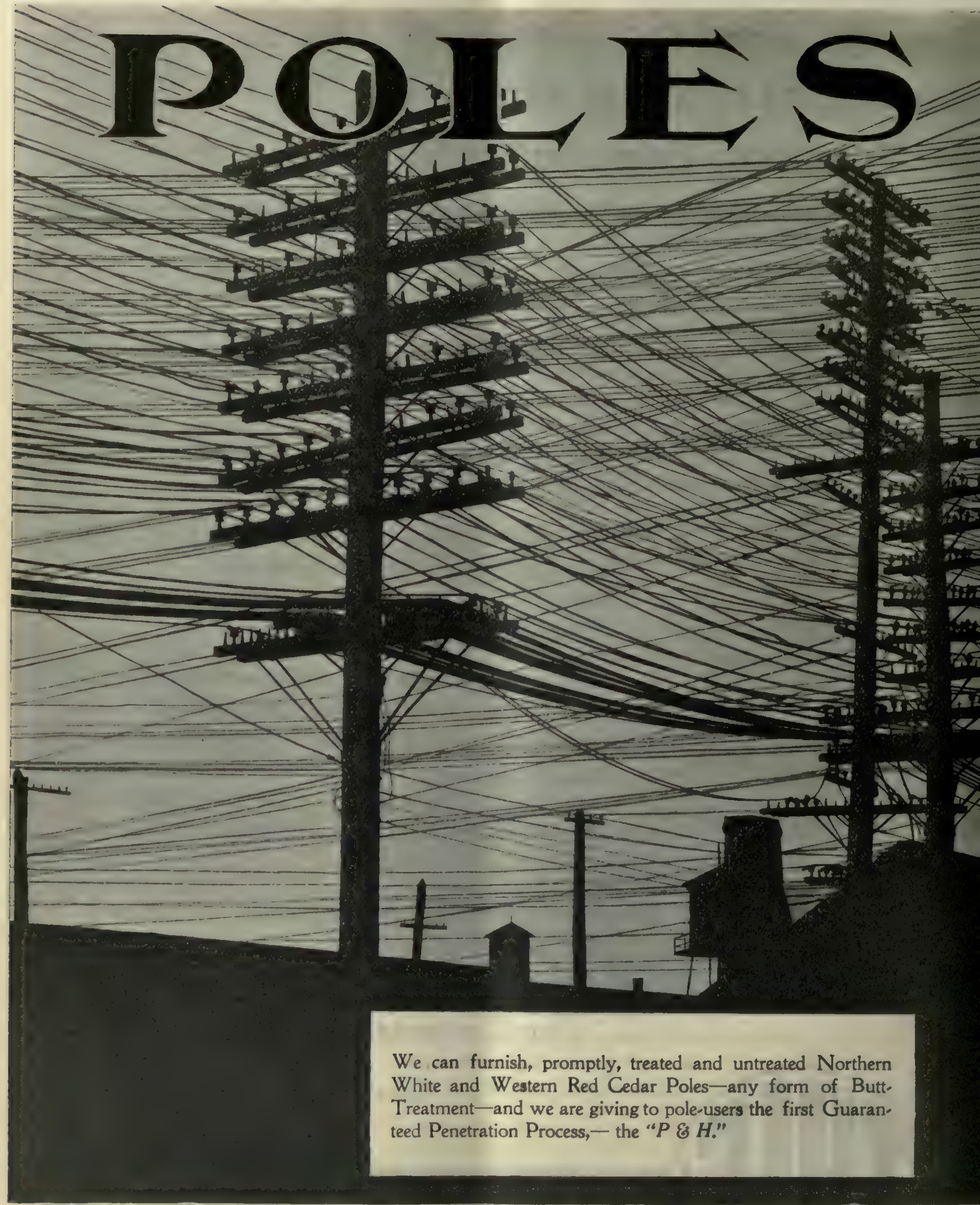
TULC
A
LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs



POLES

We can furnish, promptly, treated and untreated Northern White and Western Red Cedar Poles—any form of Butt-Treatment—and we are giving to pole-users the first Guaranteed Penetration Process,— the *"P & H."*

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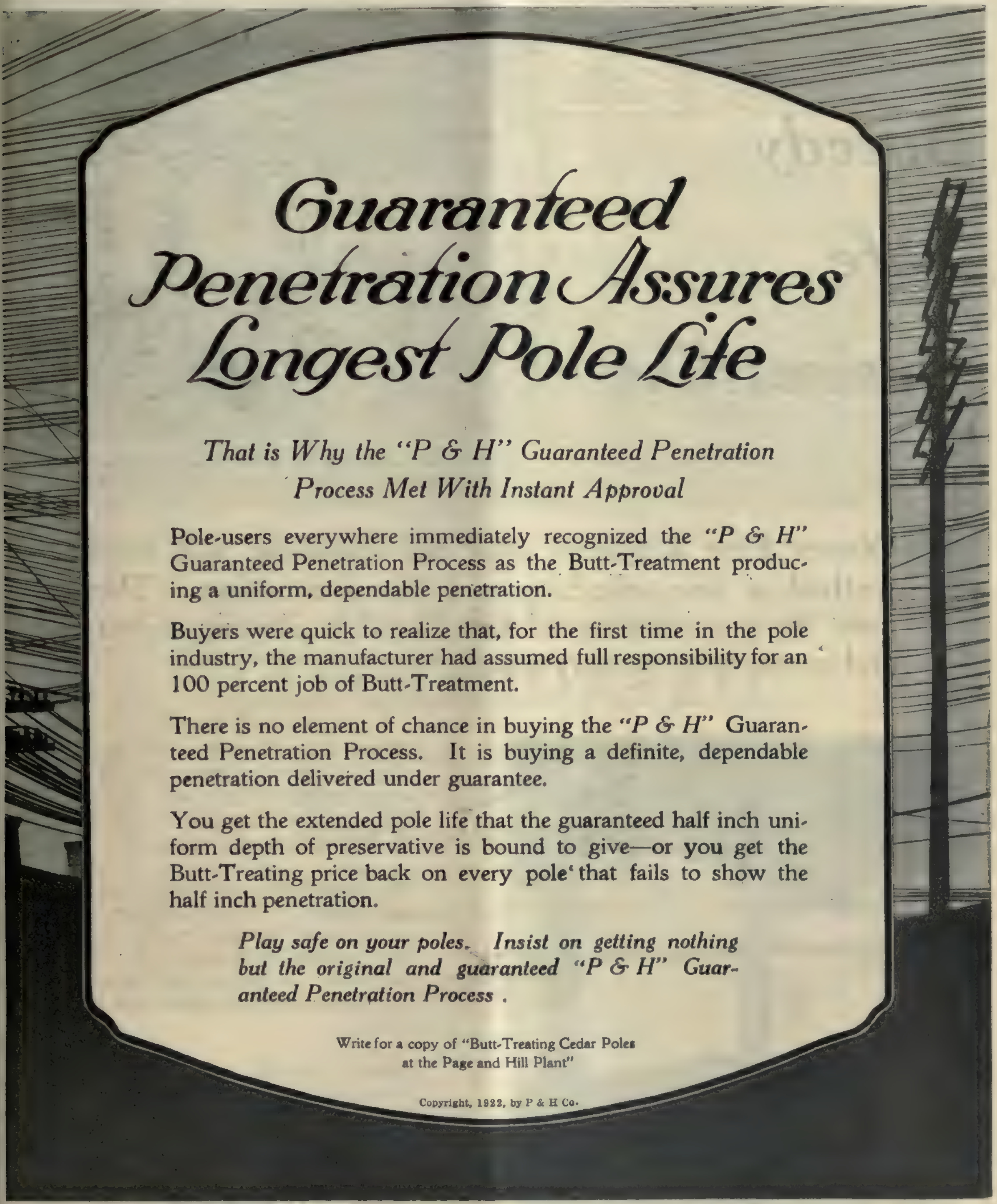

Guaranteed Penetration Assures Longest Pole Life

That is Why the "P & H" Guaranteed Penetration Process Met With Instant Approval

Pole-users everywhere immediately recognized the *"P & H"* Guaranteed Penetration Process as the Butt-Treatment producing a uniform, dependable penetration.

Buyers were quick to realize that, for the first time in the pole industry, the manufacturer had assumed full responsibility for an 100 percent job of Butt-Treatment.

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Play safe on your poles. Insist on getting nothing but the original and guaranteed "P & H" Guaranteed Penetration Process.

Write for a copy of "Butt-Treating Cedar Poles at the Page and Hill Plant"

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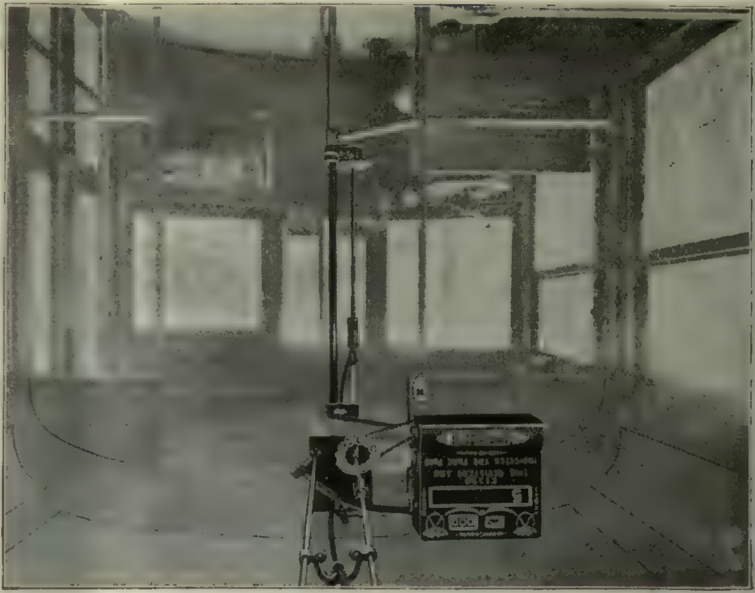

A one man car equipped with an Ohmer Fare Register with a capacity of twelve different fare classifications.

Ohmer Fare Registers offer the speediest and safest method of fare collecting and fare accounting. They meet the requirements of every kind of electric railway and motor bus transportation.

An Ohmer Fare Register installed on a motor bus.

Ohmer Fare Registers and operating equipments are made in a large variety of types and sizes so that any kind of a car or vehicle can be satisfactorily equipped.

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Ohmer Fare Registers place fare collecting on an exact business basis. Let us know something of your problems. We will help you.

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Pneumatic Door Engines
Car Heaters—Thermostat Control
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This is but a partial list of the many labor-saving, economy-producing devices which we have developed by constant contact with, and keen appreciation of electric railway operating problems.

Get quotations for complete installation

Consolidated Car Heating Co.
Albany—New York—Chicago

Stamina

INSTALLED on the shifting bank of a creek, exposed to the elements and half buried in sand and rocks, this Terry Turbo Pump Unit has given perfect service for about five years. By shifting of the bank, this unit has slid fifteen feet or more from the position in which it was originally installed, yet the superintendent of the sand company which uses it cheerfully advises us that "it has given perfect service and we expect to use it ten years more."

The stamina of a unit which permits it to operate satisfactorily under such severe conditions must make for even more satisfactory performance under good power plant conditions.

Write for Bulletin 5 for the many other reasons why you should

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THE TERRY TURBINE

Offices in Principal Cities
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The Terry Steam Turbine Co.
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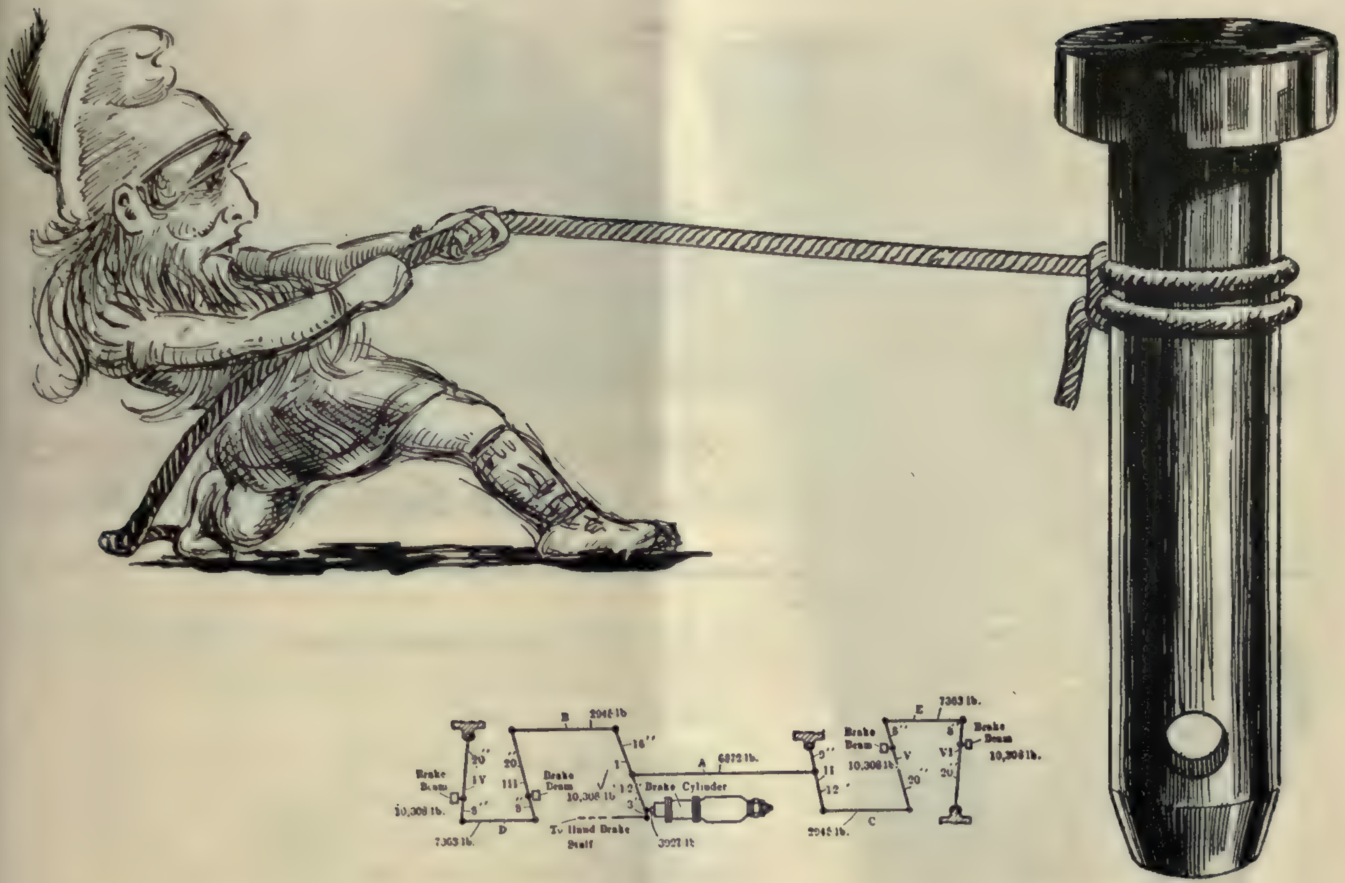

"When Greek Meets Greek Then Comes the Tug-of-War"

Or when the brakes are trying to hold back a rampageous car on a steep or slippery rail.

That's the time you've got to have trustworthy *anchor* men.

Boyerized pins and bushings in *your* brake-rigging will assure you that the full force of the braking *tug* is transmitted to the brake-shoes without failures at any of the anchorages at any of the levers.

Put 'em in now and you won't have to ask your pitmen to go through the job again when it's so cold as to be agony!

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—40 Years' Specialized Experience is back of this Better Babbitt Metal

Behind More-Jones products lies an almost matchless experience in metallurgical research and exhaustive tests.

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This metal is characterized by a high rate of heat radiation, a very low rate of wear, great flexibility and tensile strength. It has none of the brittleness of lead-base metals, nor will it creep or spread under excessive strain.

Careful tests made by some of the principal electric railways in the United States have demonstrated its superiority under severe service and high speeds, and have proven it a most economical metal for armature service.

Complete data on More-Jones Armature Babbitt together with conclusive proof of its superiority will be mailed upon request. Write today.

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TROLLEY WHEELS:
V-K *Oil-less.* M-J *Lubricated*
HARPS: V-K *Non-Arcing*
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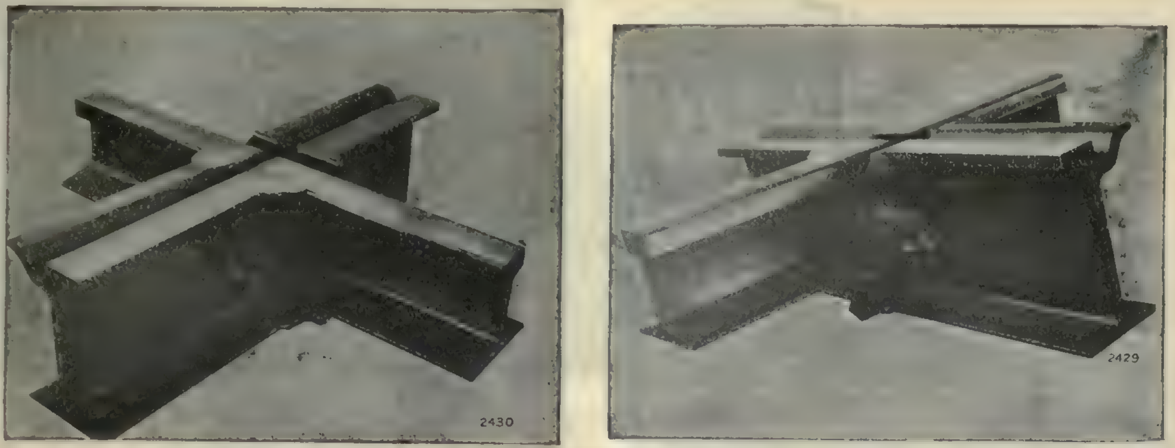

Combination Tee-Rail and Girder-Rail Frogs constructed by means of Thermit Welding.

The Inseparables: Track Maintenance Economy
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Build low-cost frogs and single- and double-track crossings in your own shops by means of our Thermit Welding Outfit. By using spare rail you have in stock you can weld together rail sections of many varieties of size, section or type, or rails of different type, as shown in the illustrations above.

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Send for our latest Rail Welding Pamphlet 3932.

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EVERY type of car for America's Electric Railways—from the light weight safety car to the heavy interurban built for high speed—is produced in the shops of the McGuire-Cummings Manufacturing Co.

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The costs of putting your wants in this projector is very slight, whether for a man, for a job, or for a market.

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We are now packing our insulators in cartons

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No breaking
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Try some of our insulators. They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

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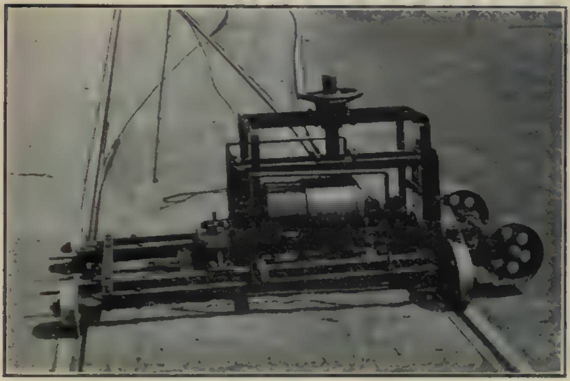
Track Labor Costs Money—*Save It!*



SEYMOUR
One-Man
RAIL GRINDER

Excessive labor costs on track work can be eliminated by employing equipment that requires only one man's time instead of two or three.

It can be done with the SEYMOUR One-Man Rail Grinder. It's light enough for one man to move, set and operate easily. Yet it sacrifices nothing in strength or durability to gain this unusual portability.

Few wearing parts is the answer.

For a two cent stamp you can get full information—and terms—that will show you the way to make worth-while savings. Will you write today?

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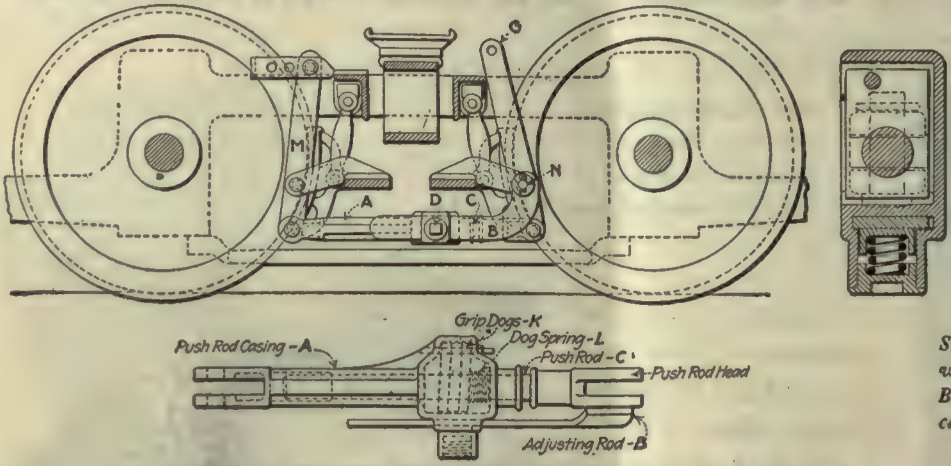
Brake-Rigging Continuously Taut with—



Details of the Gould Type Slack Adjuster as applied to an Electric Car Truck

GOULD Slack Adjuster

Specified by United Railways & Electric Co., of Baltimore, for latest safety cars.

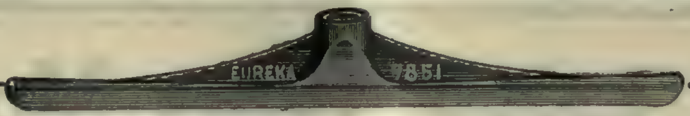
How often you notice a motorman running with brakes partially set up, due to over-anxiety to be sure that all the slack is out of rigging. The waste of power and wear on brake shoes in such cases is appalling.

Remove the incentive to run with brakes set up, by installing Gould Automatic Slack Adjusters, which keep the brakes always ready for instant response to the operator's effort. Incidentally you will save materially on shop expense, which occurs from the necessity of frequent manual adjustments of brake rigging when it is not taken care of by Gould automatic adjusters.

Write today for further information

GOULD COUPLER COMPANY

30 East 42nd St., New York City Works: Depew, N. Y. The Rookery, Chicago, Ill.



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Eureka Equipment will help to keep down maintenance costs because it is correctly designed and carefully manufactured from our own special alloys.

We can now make prompt shipments on

Commutators
Trolley Wheels
Trolley Ears
Brush Holders
Sleet Trolley Wheels
Line Material
Controller Fingers
Bearings

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The Eureka Company, Northeast, Pennsylvania
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From trolley wheel down

BAYONET

Wheels

of fresh pure metals only. Cast and turned to finest accuracy and balance. Longest life assured.

Harps

Quick detachable—only 10 seconds to make the change. Their fine construction makes these harps real money-savers.

Bases

with the one-minute pole clamp. A complete change in less than 60 seconds. Worth something under present conditions in car shops, isn't it?

They provide the maximum freedom of motion and the correct pressure of any angle of pole. Long extension springs, self-lubricated bushings and roller bearing swivel. Note construction details in the illustration below.

From roof to wire—one high class standard.

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Steam Turbines for Sustained Efficiency

Throughout years of constant operation

In the design of Allis-Chalmers Steam Turbines efficiency and reliability are the principal features receiving attention.

High efficiency under test conditions is an achievement to be proud of, but real economy can be measured only by sustained efficiency over long periods of operation.

Allis-Chalmers Turbines are known above all others for sustained efficiency throughout years of constant operation.

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MILWAUKEE, WIS. U. S. A.

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No!—Rather Let Us Say
WHAT A CHANCE!

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Never! The live up-to-date manager sees in the modern motorbus and Tracklesstrollicar a matchless opportunity to forge ahead with the times, to give his community additional transportation facilities, and to secure new economies, to tap new sources of revenue, hitherto untouched. He's studying these things with an eye to a better future.

His cry is, *"What a Chance—for Service!"*

Look up the St. Louis Quality Tracklesstrollicar

ST. LOUIS CAR COMPANY
ST. LOUIS, MO.
"The Birthplace of the Safety Car."

S-W BRAKE SLACK ADJUSTERS

SLACK in the brakes shortens brake-shoe life. Brake shoes are costly and car-house labor even more so. Inspections and upkeep require too large a force on most railways. Safety and revenue mileage cannot be increased where brake shoes are improperly set with resulting slow rates of braking and poor stops. Railway executives must face these facts squarely.

Automatic devices are safe and economical. S-W brake slack adjusters are no exception. They take up the slack in such a manner that the brake shoe gets an evenly distributed wear at every point of contact. The adjustment is automatic and inexpensive, and lasts throughout the life of the brake shoe.

S-W brake slack adjusters eliminate the old-time night inspections, waste of air because shoes are always at the correct distance from the wheel, and unnecessary strains on the brake rigging.

S-W brake slack adjusters are a big step toward maximum revenue cars because increased schedule speeds are obtained by making safer the use of high rates of braking with smooth stops.

You need to economize—let us show you how.

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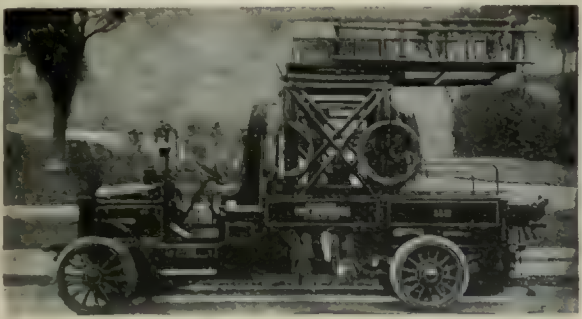

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This 3-Section

TRENTON TOWER

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The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

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They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

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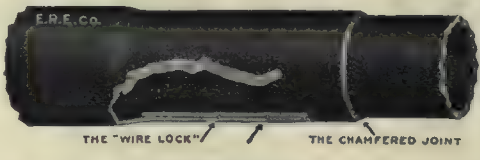
ELRECO TUBULAR POLES



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Your best insurance against insulator breakage

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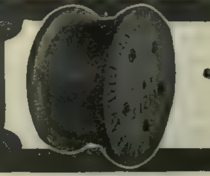

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Instrument Is in a Class by Itself

Send for Bulletin if you have Rail Bonds

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Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
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Dolph's

Insulating Varnishes and Compounds
For Electric Railways

For Armature Coils
Dolph's Chinalak Clear, Baking. Dolph's Chinalak Black, Baking.
These varnishes are china wood oil base, long in oil, high in insulation, water repelling and oilproof.

For Armatures
Dolph's Electric Lacquer. Dolph's Black Finishing No. 3.
Electric Lacquer is a black alcohol solvent varnish, is oil and waterproof and air dries in half an hour. Black Finishing No. 3 is a benzine solvent varnish, absolutely waterproof and air dries in 30 minutes.

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Dolph's Waterproof Impregnating Compound No. 17 (For use in impregnating apparatus).
Dolph's Chinalak Clear, Baking. Dolph's Chinalak Black, Baking.
All Varnishes and Compounds guaranteed as represented. Manufacturers of Insulating Varnishes exclusively since 1909.

JOHN C. DOLPH COMPANY
The Insulation Specialists
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Representatives:
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Electric Insulation

"DUTCHESS"
Varnished Cloth
and Tape

"AM-DI"
Insulating Varnishes
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"Dutchess" varnished cloth and tape are bleached and coated at our new plant built especially for the purpose and can be furnished in yellow or black and as cloth or tape of any finish or width.

"Am-Di" insulating varnishes cover a complete line of varnishes and compounds for standard work or for apparatus subject to severe conditions of vibration, oil, moisture, acid and alkali fumes, etc.

Our Laboratory and our experience are at your disposal for the solution of your insulation problems

"Electrical Insulation
made by Electrical Engineers"

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Albert J. Cox Company, Kresge Building, Detroit, Mich.
E. A. Thornwell, Candler Bldg., Atlanta, Ga.
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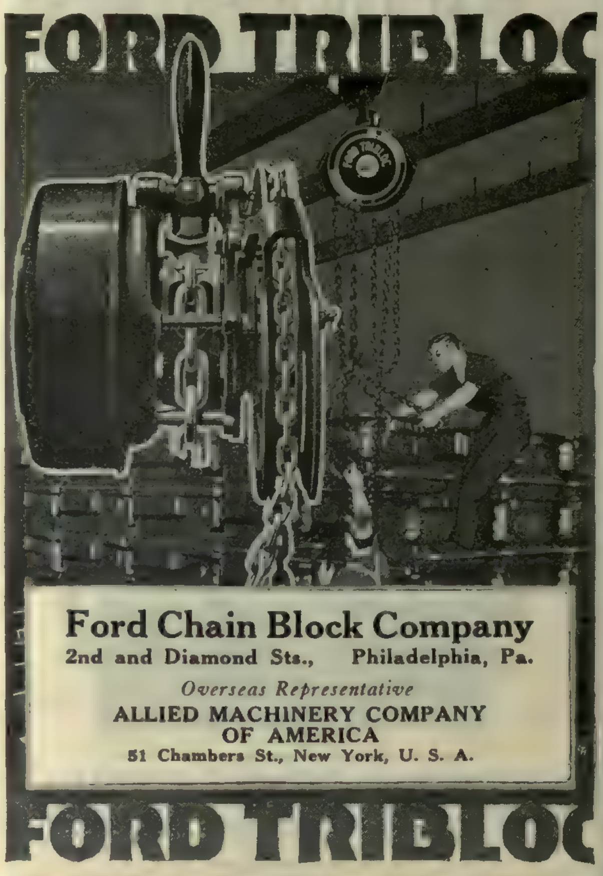

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2nd and Diamond Sts., Philadelphia, Pa.
Overseas Representative
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Consolidated Steel Corporation, 25 Broadway, New York, is the sole exporter of our commercial products.

BUCKEYE JACKS
high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
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FOSTER SUPERHEATERS
A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK
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Accurate Registration

The accurate, dependable registration secured by the use of International Registers assures a complete check on fares, and provides a basis of knowledge in the accounting after collection.

International Registers are made in single and double types for a wide variety of uses. Send for our catalogue.

Manufacturers of Single and Double fare registers, counters, car fittings. Exclusive selling agents for HEEREN ENAMEL BADGES.

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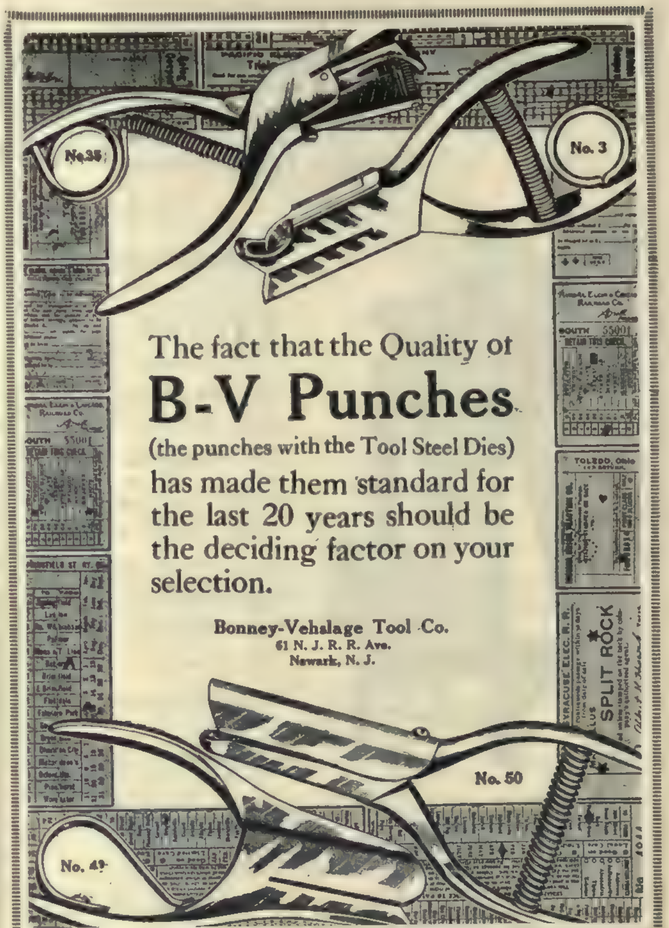

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has made them standard for the last 20 years should be the deciding factor on your selection.

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Tickets and Cash Fares.
THE CLEVELAND
accommodates both
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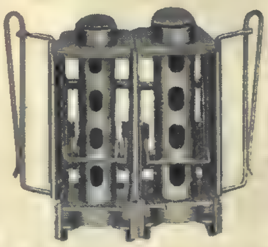

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The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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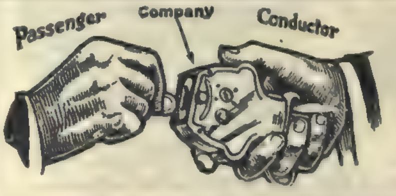
THE CUTTER ELECTRICAL AND MANUFACTURING CO. PHILADELPHIA
CIRCUIT I-T-E BREAKERS

I. T. E.
Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.



Direct Automatic Registration
By the
Passengers
Rooke Automatic Register Co.
Providence, R. I.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS

Faster than the ticket seller

Perey Manufacturing Co., Inc.
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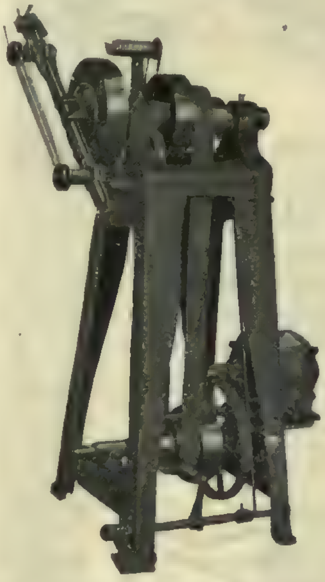
"Superior Coil Winding Machine"

The machine that will meet all your Coil Winding requirements



MOTOR gear driven, built for heavy duty as well as for light coil winding.

Write for particulars that will give you complete information on this machine.

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Manufacturers of Motor Repair Equipment.

"Personnel"—
or just employees?

—a distinction!

Are your trainmen merely hired help, or do they constitute a well-knit, spirited body, proud of their jobs and reflecting the very best of the company's policies?

American Brand Badges, Buttons and Punches lend "distinction" to the user.

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About the first thing to wear out on new equipment is the pinion — unless it is " Tool Steel "

W & B
"Railroad Special"
Wrenches

Unexcelled for Heavy Duty

7 sizes, 6 to 21 inches.

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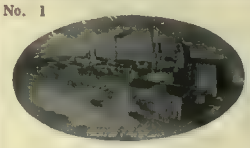

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REG. U.S. PAT. OFF.
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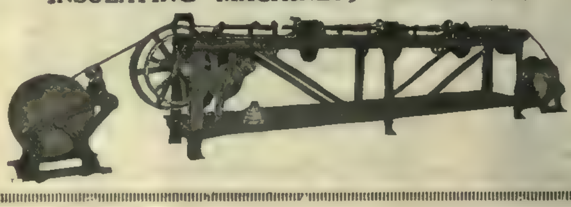
"American" Electric Railway Automatic Signals.
RECLAIMING MACHINES } **for recovering**
INSULATING MACHINES } **insulated wire**



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Reduce Your Power Bill and
Make Your Cars Easy Riding

Flange wear is greatly reduced, rail wear decreased and derailments prevented. "Nosing" of tracks is stopped. No lubrication. Car maintenance reduced. 200,000 in use.

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Bearings

AND

"Motor"
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Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

Write us for details.

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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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FOR ELECTRIC RAILWAYS

Axle Lathes
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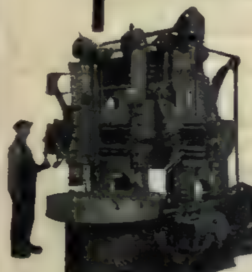

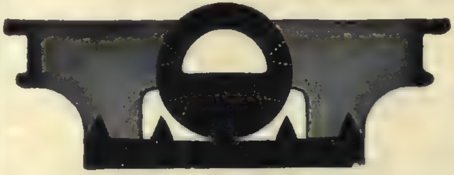

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Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
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Car Seating, Broom and Snow Sweeper Rattan, Mouldings, etc.

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AMERICAN means QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

STERLING VARNISH
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Let us tell you what other roads are accomplishing with Sterling Varnish—in the way of lowering maintenance costs and improving operation.
Consult us about a trial.

The Sterling Varnish Co., Pittsburgh, Pa.

N-L

Indicating Signals
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SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

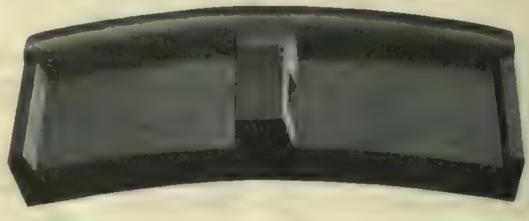
Good Brake Shoes

for safety, efficiency and economy, are just as necessary as a good track, a perfect signal system or a powerful head light.

WEIERBACH Brake Shoes

will not break in any service. They make quicker, easier stops. Tests just completed on electric cars, four Weierbach and four metal shoes staggered on trucks, show Weierbach average mileage 25.717—metal 21,144 per shoe. Either M.C.B. or A.E.R.A. Standards.

WEIERBACH BRAKE SHOE CO., SCRANTON, PA,
Western Sales Agt., AL. H. HOFFMAN,
315 American Bank Bldg., Los Angeles, Calif.



That little safety car pinion must make a lot of revolutions per year.

It will make them for many years if "it is "Tool Steel"

ACME STEEL DOORS
MECHANICALLY PERFECT
possessing combination of
Great Strength with Minimum Weight
result of many years of experience
of their designers.
MORTON MANUFACTURING CO., Chicago

DURSON BRAKE REGULATOR

Adjustment for slack is made on the application of the brake, not on the release.

Send for full details.

Hamilton & Hansell, Inc., 13 Park Row, New York, N. Y.

Brake Shoes
A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type

Standard Patterns for

SAFETY CAR

D-67 for Narrow Treads
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American Brake Shoe and Foundry Co.
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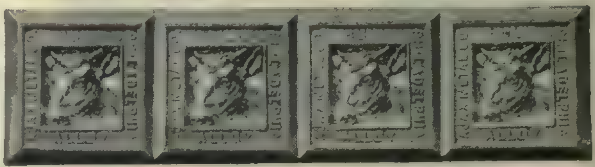
BETTER THAN BABBITT
wears longer—runs cooler—costs less
used by electric railways at home and abroad
AJAX BULL BEARING ALLOY
made from the purest virgin metals to a scientifically correct formula by the AJAX PROCESS which greatly increases endurance and wearing qualities.

THE AJAX METAL COMPANY
Established 1880
Main Office and Works: Philadelphia, Pa.



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The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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SUPER-SEASONED FIBRE

Peerless Insulation Paper has 25 to 50 per cent higher electrical resistance.

S-S
TRADE MARK

Hornflex Insulation Paper has no grain. Folds without cracking.

NATIONAL FIBRE & INSULATION CO.
Box 418 Yorklyn, Delaware.

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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POSITIONS VACANT—Business Opportunities and other undisplayed ads. 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS WANTED

FOREMAN, experienced in overhauling and maintenance of rolling stock motors, etc. Handle men to advantage. Best references. PW-391, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

PRACTICAL master mechanic, 22 years' experience. Up to date in reconstruction of equipment. Can handle men and get results. Experience in one man cars and overhead line work. Best reference. PW-388, Elec. Ry. Journal.

SUPERINTENDENT of transportation, with a fine record of 17 years on large city and interurban properties, desires a change. Capable of taking over details of transportation of any property and operating same in an economical manner. Capable of getting best of results from employees. High grade references from leading men in railway field. Address stating full details. PW-392, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

PURCHASING agent, 9 years' experience with one of the largest traction systems in the country. Capable and energetic. Best references. PW-394, Elec. Ry. Journal, Leader-News Bldg., Cleveland, Ohio.

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Sales Engineer

Wanted high grade resident sales engineer, for special territory for a line of maintenance and construction material for street railways. One familiar with and in high standing with street railways in his territory. AS-393, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

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First National Bank Building
Cincinnati, Ohio Telephone M 2662

Cable Address - Pasco, Cincinnati
Code Western Union 5 Letter-A.B.C. 4th & 5th Edition

POWER PLANT EQUIPMENT

A1 Units Immediate Delivery

TURBO ALTERNATOR UNITS.

1—10,000 kw. Allis-Chalmers 80% P. F. Condensing Turbo Unit, 60 cyc., 3 ph., 2,300-4,600-11,000 volts, 200 lb. I. S. P., 150-200 degrees superheat. Complete with surface condenser and auxiliaries.
1—6,500 kva. Allis-Chalmers Condensing Turbo Unit, 60 cyc., 3 ph., 2,300 volt. Complete layout, including jet condenser and all auxiliaries.
1—3,000 kw. Westinghouse (actual capacity approx. 4,000 kw.) Condensing Turbo Unit, 60 cyc., 3 ph., 2,300-4,400 v.
1—1,500 kw. Westinghouse *Complete Turbo Alternator Station*, 60 cyc., 3 ph., 2,400 volt, 3,600 r.p.m., including Le Blanc jet condenser, boiler plant and building.
1—2,000 kw. Allis-Chalmers Condensing Turbo Unit (actual capacity approximately 3,000 kw.), 60 cyc., 3 ph., 2,300 volt. Complete with jet ondenser and auxiliaries.
2—1,250 kw. Westinghouse Condensing or Non-Condensing Turbines (actual capacity 1,500-1,800 kw.), 60 cyc., 3 ph., 480, 2,300 or 11,000 volts, 1,200 r.p.m. Complete with Le Blanc condensers.
2—600 kw. Westinghouse Non-Condensing Turbo Units, 60 cyc., 2 or 3 phase, 220-480 or 2,400 volts. Units newly rewound and rebladed.
1—500 kw. Westinghouse Condensing Turbo Unit, 60 cyc., 2 or 3 phase, 2,200 volt, 3,600 r.p.m. Complete with surface condenser.
1—1,000 kw. General Electric-Curtis VERTICAL Condensing Turbo Unit, 60 cyc., 3 ph., 2,300 volt, 1,200 r.p.m. Complete with jet condenser.
1—1,500 kw. General Electric VERTICAL Condensing Turbo (actual capacity 2,200 kw.). 60 cyc., 3 ph., 2,300 v., 900 r.p.m. Complete with surface condenser, piping and all auxiliaries.
1—5,000 kw. General Electric-Curtis Vertical Turbo Unit, 60 cyc., 3 ph., 2,300-4,500 volt, 720 r.p.m. Complete with surface ondenser, piping and all auxiliaries. Complete installation.
1—10,000 kw. General Electric VERTICAL Condensing Turbo Unit, 60 cyc., 3 ph., 6,600-11,000 volt, 720 r.p.m. Complete with surface condenser and auxiliaries.
1—10,000 kw. General Electric VERTICAL CONDENSING Turbo Unit, 25 *cycle*, 3 phase, 6,600 volt. Complete with surface condenser and all auxiliaries.
1—1,500 kw. General Electric VERTICAL Condensing Turbo Unit, 25 *cycle*, 3 phase, 11,000 volts.

DIRECT CURRENT UNITS

1—1,500 kw. Westinghouse Engine Type Generator, 220-250 volt, direct connected to horizontal heavy duty cross compound Corliss engine.
1—1,200 kw. General Electric M. P. Engine Type Generator, 250-500 volts, direct connected to tandem compound heavy duty Corliss engine.
1—800 kw. Same as above.

BOILERS

3—350 hp. Stirling B. & W. Water Tube Boilers. 200-lb. allowance. Without grates or stokers.
4—500 hp. B. & W. Steel Header Water Tube Boilers. 12 tubes wide, 21 tubes high. 200-lb. allowance. Complete with stokers and all fittings.
1—500 hp. Stirling B. & W. Water Tube Boiler. 160-lb. allowance. Complete with stoker and fittings.
1—250 hp. Heinie Steel Header Water Tube Boiler. 150-lb. allowance.

USED CARS

For Every Service

Railway Motors

Standardize Your Equipments at Minimum Cost

TRANSIT EQUIPMENT CO.
501 Fifth Avenue, New York

ROTARY CONVERTERS

1—500 kw. Westinghouse, 3-phase, 60 cycle, 360 volts A.C.; 600 volts D.C.; 400 r.p.m., with 2—300 kw. Westinghouse 2400/380 volt transformers, also switchboard.

2—300 kw. Stanley, 3 phase, 25 cycle, 360 volts A.C.; 600 volt D.C.; speed, 500 r.p.m.; complete, with suitable transformers, also panels.

1—300 kw. Westinghouse, 3 phase, 60 cycle, 370 volts A.C.; 575 volts D.C.; 600 r.p.m.

MOTOR GENERATOR SETS

2—1000 kw. General Electric Synchronous Motor Generator Sets, each consisting of 1—1000 kw., 600-volt type MPC, 514 r.p.m., D.C. generator, and 1—1400 kva., 3 phase, 60 cycle, 2300/4000 volt, 514 r.p.m. synch. motor.

DIRECT CONNECTED ENGINE UNIT

1—850 kw. Gen. Elec. 575-volt Compound Wound 100 r.p.m. Generator, direct connected to 23 and 54 x 48 Greene Wheelock cross compound heavy duty 4-valve engine, complete with surface condensing equipment and panel; price, f.o.b. cars, $7,500.

ARCHER & BALDWIN, Inc., 114 Liberty St., New York City
Telephone 4337-4338 Rector

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using.
This may be occupying valuable space, collecting dust,
rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION IS HELPING OTHERS
—LET IT HELP YOU ALSO

0073

700 tons new 9 in.

GIRDER RAIL

Penna. Steel Co. Section 228, 107 lb. to the yard. Attractive price upon application. Subject to R. W. Hunt & Company's Inspection. Prompt shipment.

H. M. FOSTER COMPANY
Continental Building, Baltimore, Md.

FOR SALE

SECOND HAND CARS

trucks and motors

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Phila., Pa.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.
Air Aftercoolers
Ingersoll-Rand Co.
Air Compressors
Ingersoll-Rand Co.
Air Motors
Ingersoll-Rand Co.
Air Receivers
Ingersoll-Rand Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Angle Bars
Ingersoll-Rand Co.
Anti-Climbers
Railway Improvement Co.
Armature Shop Tools
Armature Coil Equip. Co.
Elec. Service Sup. Co.
Axles
Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ord. Co.
St. Louis Car Co.
Axle Straighteners
Columbia M. W. & M. I. Co.
Axles, Car Wheels
Bemis Car Truck Co.
Brill Co., The J. G.
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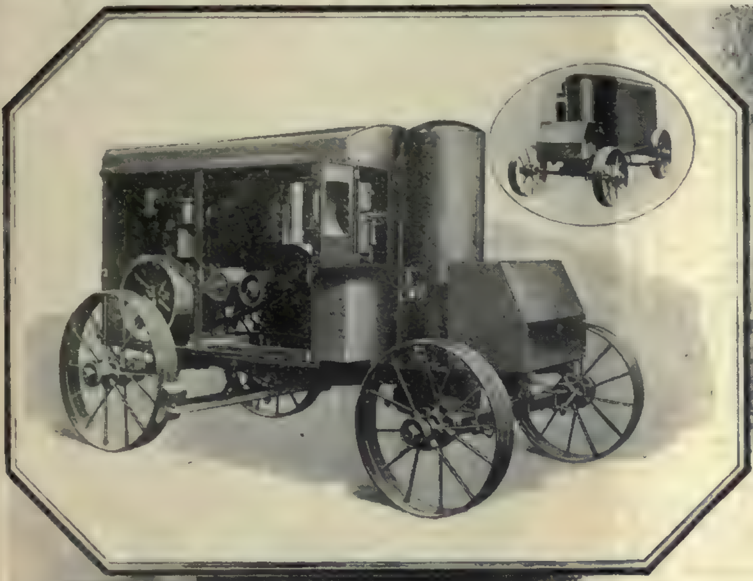

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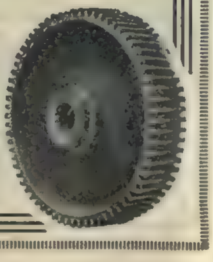

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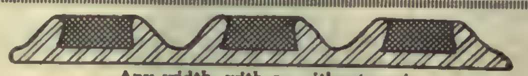

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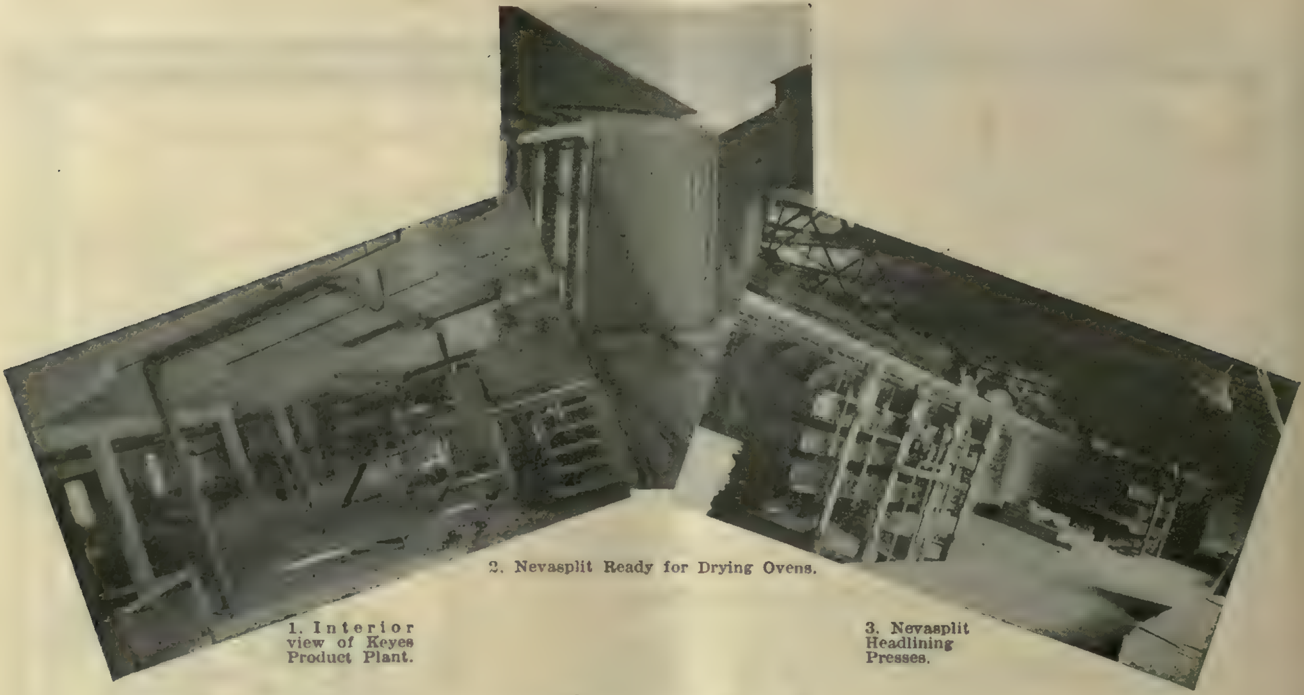

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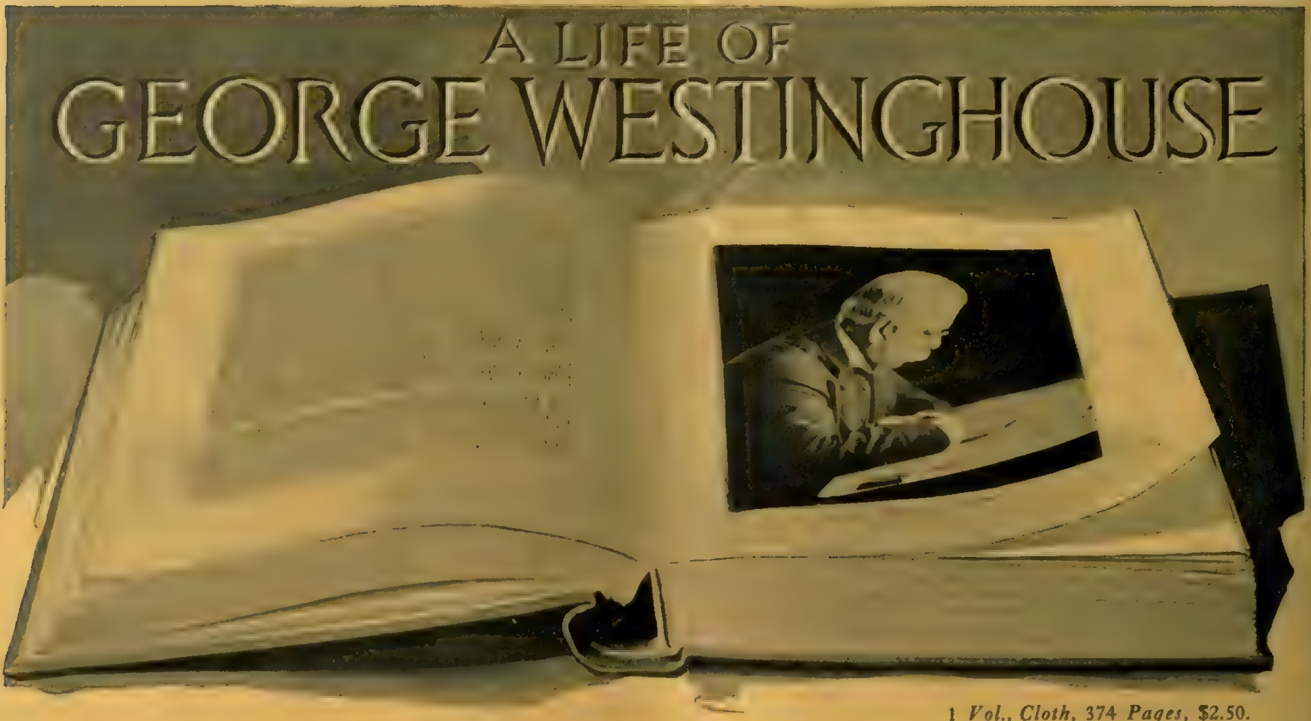

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These associated papers are in lines more or less closely connected with the electric railway field, as follows:

Four relate to other branches of the electrical field. Three cover respectively merchandising, Pacific Coast electrical activities, and industrial engineering, while one large paper is devoted to the central station industry and broadly to the scientific engineering and commercial fields of electrical engineering. Two other McGraw-Hill papers are devoted to the engineering and commercial aspects of mining, one to coal mining and the other to metal mining. Two other papers, one published in New York and one in London, discuss new ideas in machinery and shop management. Another is devoted to civil engineering and construction. Another specializes in the generation of power and still another is the authority on developments in the chemical, metallurgical and allied industries. Engineering developments in Spain and Latin America are recorded in a Spanish paper. Finally, one paper is devoted to bus transportation. Each of these papers is the leader in its chosen field.

The "Electric Railway Journal" is indebted to some of these papers for information published each week in this paper. Thus, the quotations on the price of coal in the department of Manufactures and Markets would not be possible without the service supplied by "Coal Age," nor those on metals without the "Engineering and Mining Journal."

The establishment of a new paper like "Bus Transportation" is not a venture in an untried field by the McGraw-Hill Company. It is in line with its publishing policy, and better service can be given by "Electric Railway Journal" and "Bus Transportation" because both are published by the same company.

Circulation of this Issue, 6,300 **Advertising Index—Alphabetical, 34; Classified, 30,32; Searchlight Section, 29**

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(AUTOMATIC)

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FOR TRACTION SERVICE

SAFETY. Eliminate personal danger in coupling cars; cannot separate by accident, while in operation, due to unevenness of track or other cause; coupling remains tight and safe even if lock on one coupler becomes deranged, locks being so designed that one alone is required to prevent uncoupling except in usual manner.

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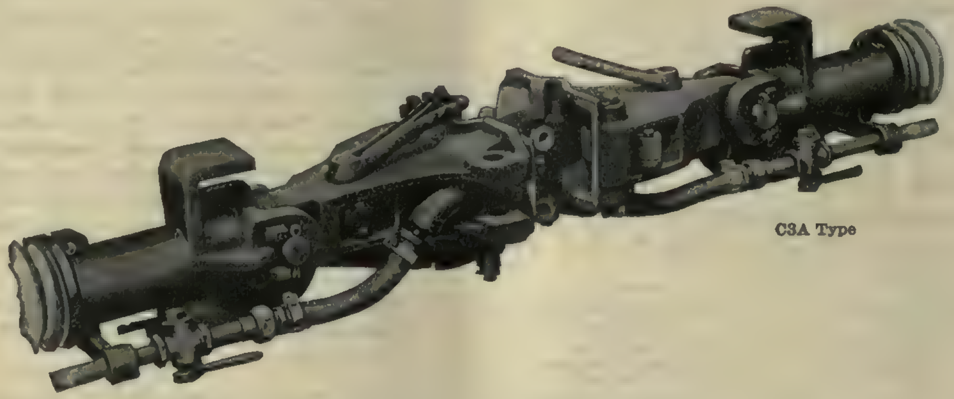
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O-B Form 1 Base endures because of Renewable Bushings on all wearing parts.

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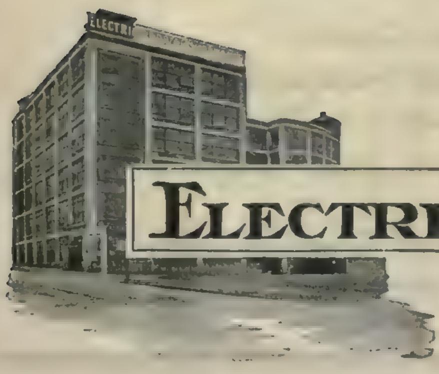
Send for the data sheets describing in detail these specialties that are "endorsed by universal preference."



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Cleaning Up Corrugations

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will save more than the rail

It is not the rail alone which suffers from corrugations. The entire track structure is subjected to a destructive vibration and battering when heavy cars thunder over any piece of corrugated rail. Entirely aside from the bad effect on passengers and cars, it will pay you from a track maintenance standpoint to wage vigorous warfare against corrugations.

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The grinding blocks are shaped to conform to the original contour of the rail head. The rail head is not flattened.

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We make and sell the famous—

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"that's how we lose the whistle—"

Said the conductor angrily as a passenger wedged aboard just when the crossing cop's whistle blew the "go-go."

That precious minute was lost because the conductor was too occupied in making change on a hand-doored, hand-signalled car.

National Pneumatic Door and Step Control would have permitted closing the doors with a flip of the wrist.

National Pneumatic Motorman's Signal Lights would have given the starting signals as the doors closed.

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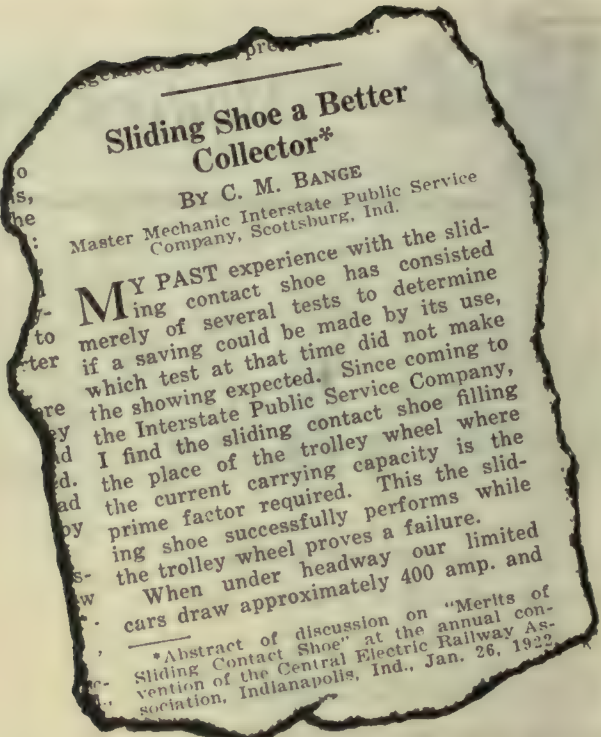

Sliding Shoe a Better Collector*

By C. M. Bange

Master Mechanic Interstate Public Service Company, Scottsburg, Ind.

MY PAST experience with the sliding contact shoe has consisted merely of several tests to determine if a saving could be made by its use, which test at that time did not make the showing expected. Since coming to the Interstate Public Service Company, I find the sliding contact shoe filling the place of the trolley wheel where the current carrying capacity is the prime factor required. This the sliding shoe successfully performs while the trolley wheel proves a failure.

When under headway our limited cars draw approximately 400 amp. and

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*Abstract of discussion on "Merits of Sliding Contact Shoe" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

This and other papers read at the recent meeting of the Central Electric Railway Association were all reported in the Electric Railway Journal, February 4, 1922.

Read them all—then try out the

MILLER Trolley Shoe

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It meets every requirement for increased efficiency

We want you to prove the case for yourself because we know that Miller Trolley Shoes will be more economical and more satisfactory in any class of service.

Make your own tests by equipping one entire line—don't mix shoes and wheels on the same wire. The wheels arc and rough-up the wire, then the shoes smooth it off. But shoes alone will not wear or burn the wire as much as wheels. They last longer—require no lubrication and almost negligible maintenance—less than half that of wheels.

Look into this subject now—

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THERE is a story told of a Candidate for Office (you couldn't call him a Politician) who appeared before a gathering of factory hands.

To show his "DEMOCRACY" he hid his fine clothes beneath a suit of brand new overalls.

He thought that would please the crowd. Instead they laughed. They knew he was bluffing.

But—

When there is OVERALL WORK to be done,

that's the time the man who is accustomed to them wins.

We know this to be true of Lubrication Engineers.

For Texaco Lubrication Engineers are not swivel chair engineers. They are at home in overalls.

They know their business in the practical sense.

When they tell you to use a certain Texaco Lubricant for a certain purpose, they KNOW that it will work—right.

They have watched it work time and time again—not from the side lines, but right alongside the man in overalls, whose job it is to keep the equipment running at the maximum capacity for the least cost.

Texaco Recommendations Are Sound

They are made by men who have their feet on the ground.

Ask us for a practical solution of any problem of lubrication—all roads have them once in a while—and see for yourself how quickly Texaco Service and Texaco Lubricants will banish the trouble.

There is a Texaco Lubricant for every purpose—
rolling stock, power plant, sub-station—everywhere.

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- —in fact everything electrical.

Street railways can economize still further by using one of the successful big store methods of stockkeeping and buying.

The idea is to keep the stocks of electrical goods for repairs and replacements as low as practicable. Obviously this reduces an investment which does not earn until the material is put to use.

This big store economy can be applied, small stocks carried and a minimum time for non-productive investment obtained by using the quick shipping facilities and large stocks available at the nearest Western Electric Distributing House.

Everything electrical is obtainable through our 48 Houses. They maintain large stocks. Their organization makes it practical to use this mercantile method and obtain the full advantages of keeping a lower investment in reserve stock and turning it over frequently.

Address our nearest House.

A
National
Electrical
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Ground Pinion Bores assure a correct fit on armature shaft and prevent injury to the shaft taper.

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"The 'Standard' Brand on your material is an assurance of eventual economy."

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THE ECONOMY METER WITH INSPECTION DIALS is readily adaptable to any electric car or locomotive operating conditions. It is the only power-saving device whose unit is correct for use in determining when cars should be inspected.

The saving resulting from inspection on the kilowatt hour basis has been found, by several companies, sufficient in itself to make profitable the purchase of meters.

Buys Economy Meters

complete with Power Saving and Car Inspection Dials

After a study of the possible economies, this progressive city and interurban railway system has ordered

Economy Meters

to Save Power at the Car
to Save Labor at the Car Houses

This is another one of the long list of notable electric railways to adopt the Economy Meter. Economy Meters are now standard on nearly 100 roads.

Economy Meters are Rugged Time-tried Devices

The Economy Meter will induce the maximum power saving with no hazard to passengers or equipment. It shows how much energy is consumed per man or per car. The records actually tell a motorman whether he has saved power—and how much.

There is no mystery
about Power Saving
with Economy Meters

Meter the Energy—that's what you want to save

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Figure your line renewals now and start getting quotations on materials.

Columbia Ears are made according to well-tested designs. Only fresh metals, correctly alloyed for maximum durability, are used.

Our prices are in line and deliveries prompt.

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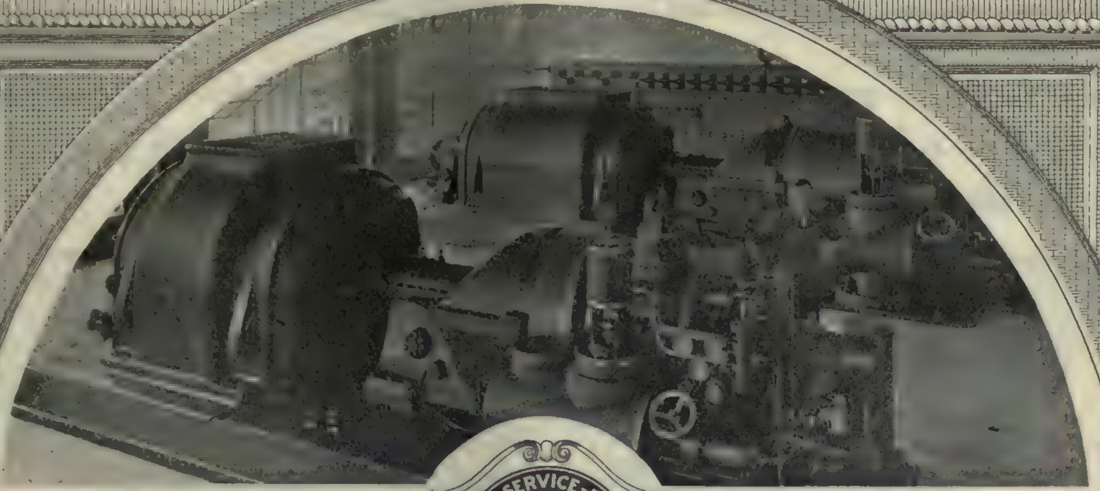

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Galena Turbine Oils — light, medium, heavy — and Galena White Turbine Oil must, from the crude to the finished state, conform with Galena Quality specifications. Suitability for the work required is the first consideration.

These oils are giving exceptional service on both unit and gravity systems in turbine lubrication and the lighter grades have demonstrated the value of oil quality, where used in high speed light turbines, reciprocating engines and fast running machinery of all kinds.

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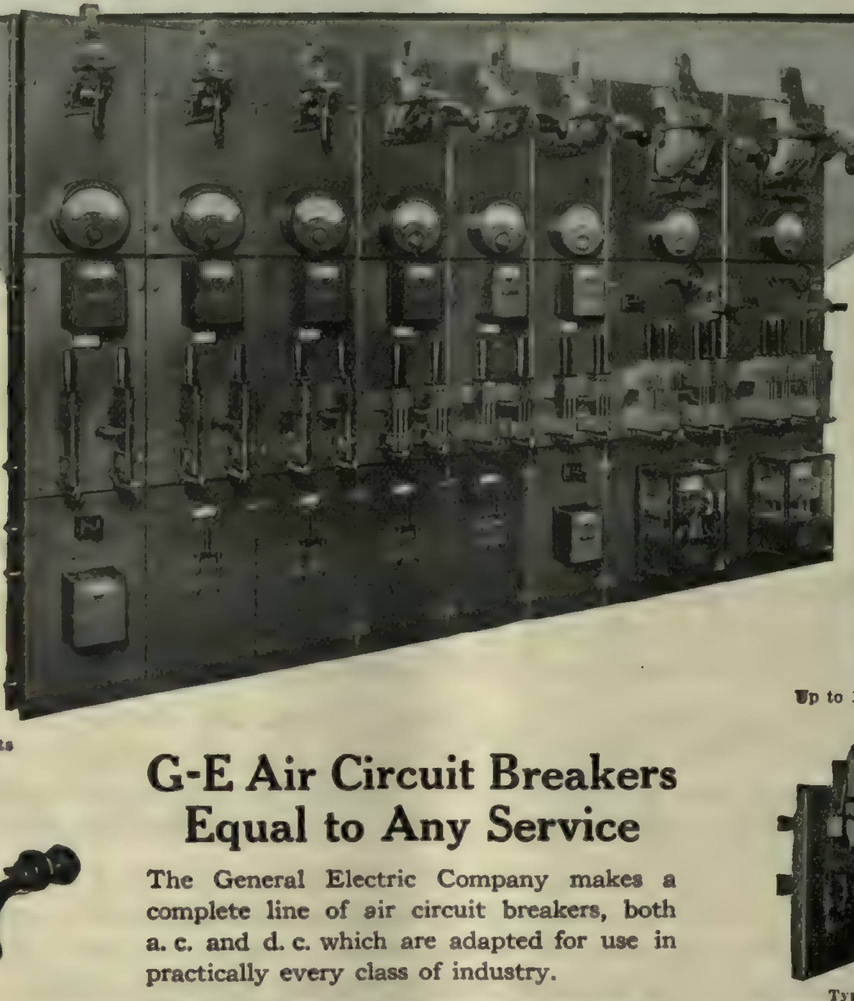
The infinite attention to details necessary to produce a complete line of switchboard equipment results in high quality in individual devices



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Up to 6000 amps., 650 volts

Type CP-3
Up to 1200 amps., 650 volts

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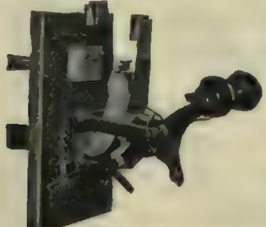
These breakers are all designed to afford the greatest protection to the equipment. Built of standardized parts they embody the features which years of engineering and practical experience have shown to be best. They have successfully met the ultimate test—long, hard service.

The General Electric Company's experts are always ready to help in the selection of the proper air circuit breaker for any job.



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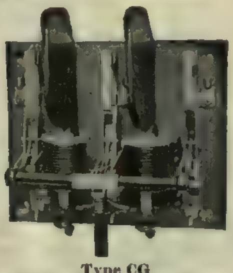

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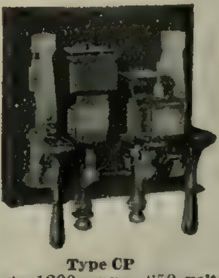

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 59 New York, Saturday, February 25, 1922 *Number* 8

Prepare Moderately for the Coal Strike

TRUE to expectations and true to its kind of thinking, the coal miners' union has ignored the counsel of its better leaders and recommended a nation-wide strike on April 1, if its terms of employment are not met. There is to be a referendum of the membership on the question, and while it may be too much to expect that the referendum vote will be against a strike, yet the demands for a six-hour day and a five-day week are so thoroughly out of line with the whole trend of the times that such a vote would be only common sense. These demands are certain to bring general public disapproval, and this must be obvious to the unions. One must then conclude that it is all done as the initial proffer in the old game of horse trading. Hence, while it is only the part of business prudence to increase the normal coal stock, there is no occasion now for electric railways to get "panicky" about placing coal orders.

Should the miners actually go on strike the editors of this paper will feel that there is a motive more impelling than that shown in the demands set forth. The reputation of the coal operators is such that one is inclined to inquire into the other side of the story. The fault may not all be with the miners. Conditions as regards both capital and labor have been very unsatisfactory in this field for so long that a strike now would probably be followed by prompt government intervention. It is known that the Department of Commerce has been working in this field for some time, though so far without apparent success, endeavoring to bring a peaceful solution.

The prospect thus seems to be this: A strike is not imminent now. If it actually takes place, it will not be of dangerously long duration, so far as part normal production is concerned. Meantime, there are large quantities of coal in storage. Finally, a strike may precipitate a very rigid government regulation of the industry.

"Safety Always" Means Just That

THE committee on safety work of the Transportation & Traffic Association plans this year a somewhat unusual program, the purpose being to attract greater interest in safety methods. It is somewhat strange that there should be any need in this direction. Unfortunately it is often most difficult to convince a man that he should do the obvious thing, provided it is something which he can put off until tomorrow, than to do something far less important if he has to do it immediately. This is true not only as regards individuals and companies but the public as a whole. They also need to be jarred into the necessity for safety work. Because of this, many companies have not done as much as they might in promoting safety. To overcome this inertia, the committee proposes to furnish the companies with new ideas by which they can attract the attention of the public and secure its co-operation. The committee also proposes to bring out the best ideas in regard to safety programs. May success attend its efforts.

The New York Valuation Discussion Has Now Begun

IT IS yet too early to comment on or criticise intelligently and in detail the valuation figures contained in the report to the New York Transit Commission by its Bureau of Valuation. It must be remembered that that is all these figures really are—a report to the commission by its own valuation force. But since this report will presumably have greater weight than any other one thing in the commission's final determination of value, it is worth while knowing exactly what these figures are and what they signify.

The "net valuation" which Mr. Madden and Mr. Lindars recommend as the desirable and equitable figure is called "original cost less the expenditures necessary to place the property in first-class operating condition." It should be pointed out that, according to Mr. Madden's testimony, this figure is not based on "original cost" but on an appraised value, using prices and possibly conditions so far as they could be ascertained, which were supposed to apply at the time the properties were constructed. That is to say, underground conduit lines built in 1898 or elevated railway structures built in 1880 were appraised at the figures for material and labor applying in those years, though the extent to which the conditions which surrounded or accompanied the construction of these systems received consideration is not apparent. It will be recalled that extensive underground structures had to be moved when the slot system was installed in the nineties; "air rights" had to be paid for by the elevated structures; other obstacles not now discoverable had to be taken care of as the exigencies of the times demanded. These all called for large expenditures, legitimately included in "original cost" but not possible to locate in an appraisal based only on June, 1921, inventories.

This, however, is not the only basis Mr. Madden considered. He has set up three "reproduction costs": one on the basis of prices applying at the time different portions of the railway were built or rolling stock bought; one on the basis of 1910 to 1914 prices or the "pre-war" period, and one on the basis of 1921 prices. Of these three bases of valuation, namely, "original prices," pre-war and present prices, Mr. Madden commends the first as the proper basis. But the public in general should not be misled by having an appraised value called "original cost."

It should not be inferred from the adoption of this method that actual original cost was discarded as undesirable—it was rejected because the original cost could not be ascertained—the records were gone. Therefore an effort was made to set up original cost by estimate. Mr. Madden testified that he compared his estimates with the company cost records when these were available, but at most these records merely "checked" his estimates.

Two or three other things are apparent in the valuation report. The final figure, while much lower than the capitalization—even greatly lower than the total of securities in the hands of the public—is not very far from the present market value of these securities so far as that value may be roughly determined. It is also worth noting that the announcement of these valuations had little effect on the Wall Street market. Some financial writers claim this proves that the public had already appraised the properties and that this indicates the valuations to be not far afield. On the other hand, the figures of Mr. Madden based on a 1921 price basis—a "present value" basis—less the expenditure to restore to first-class operating conditions, would make a value of approximately $700,000,000, as compared to the $465,000,000 recommended. Also there are many decisions against basing the final conclusion as to value upon original cost alone when present value is much higher, and it may be seriously questioned whether the $465,000,000 can be sustained as equitable, even if it were the original cost.

It does seem that Mr. Madden has stayed on thoroughly sound ground when he takes as his measure of depreciation that money which would have to be expended to place the properties in first-class operating condition. While showing what the straight line depreciation would be, he recommends the basis of judging depreciation solely on the basis of deterioration of service and not on any theoretical basis. Presumably if the properties were in first-class operating condition there would be no depreciation—which is sound economics. But even in counting this depreciation, the question arises as to whether the companies do not have an account against the city for that deterioration in service condition which has occurred since they first sought an adjustment in fare to allow them properly to maintain their properties.

But all these points and many others will probably be brought out at the hearings which will commence on March 6. The figures are before the companies, the city, the public and the commission for their examination and discussion. In what is certainly the greatest valuation in the electric railway industry, Mr. Madden and Mr. Lindars have produced a report for which they deserve sincere commendation. Figures for physical construction costs are so supported and accompanied by data and statistics that any one can easily learn how such figures were obtained and can agree or disagree in as great detail as he desires. Discussion will probably be more upon methods, upon the basis of choosing figures and facts, however, than upon detail.

In addition, it should be remembered that the commission is still to find and announce a valuation based on prospective earning capacity based on the franchise rates of fare. There is as yet no indication of what this figure will be. While Chairman McAneny has announced that it probably will not modify things much, nevertheless when it is finally prepared and announced it may prove to be more of a factor than is now anticipated.

Finally, it must be remembered that the decision of a commission in valuation procedure is, after all, a matter of judgment in which the general social good must be considered along with cold engineering, financial, economic and legal facts. The Transit Commission, in its activities so far, seems actuated by a desire to see that equity and justice are assured to all and that, above everything, the public will finally obtain a satisfactory transportation service at a fair price. If this principle is followed throughout the proceedings, no more can be asked. As the law stands, the companies may accept or reject the figures which the commission allows. It is earnestly hoped, now the valuation discussion has started, that all interested will lend a hand to help decide fairly this most difficult of questions.

Mischievous Comment Spread Before Employees

AS A USUAL thing leaders in union movements know a great deal more about economics and economic conditions than they receive credit for knowing. It is for this reason principally that statements made in the *Motorman and Conductor* for February challenge attention. A great deal of nonsense has of course been written about the poor widow and orphan as the holders of corporation securities, but the statement can hardly be allowed to go unchallenged which the *Motorman and Conductor* makes that "the stocks and bonds of security holders may become worthless without in the least inconveniencing them in the way of gaining a necessary livelihood." In the loss of return on the investment of the security holder the paper mentioned sees only the loss of the security holder's "speculative interest and not his life-sustaining interest."

The stockholder in a business is of course a partner in it. In becoming a partner he assumes all the risk that goes with ownership. Often the holder of stock in an enterprise was prompted to make his purchase by the hope of profit through enhancement of the value of his purchase. This is the worst, perhaps, that may be said for the stockholder. Estates, individuals and private corporations such as life insurance societies are, however, the principal purchasers of bonds. They are prompted in making such purchases by other motives than gain. Their thought is first for the safety of their principal and second for the assurance of their income returns. They are creditors; they are money lenders. Many individuals are among the purchasers of such securities. They buy them against the inevitable rainy day. And the rainy day of such investor is the day when his earning power has vanished either through sickness or superannuation, and he is as a last resort thrown back for support upon the income from his accumulations. Such purchasers take for the cash they lend to the issuing corporation the promise of that corporation to pay back the principal at a fixed date and in the meantime to pay the interest on the loan. The loss of either principal or interest is no less harmful to them than would be the failure of some friend of Motorman Jones or Conductor Smith to pay back to him a loan of $500 or $1,000. Moreover, sight is also lost entirely by the *Motorman and Conductor* of the fact that anything that reacts unfavorably upon a corporation necessarily reacts unfavorably upon its employees.

All this is elementary to the point, undoubtedly, of becoming disheartening in its recital to most people. The statements in the *Motorman and Conductor*, however, appear to make the reiteration of the facts necessary. Railway companies would do well to make the facts plain to their help so as to correct the erroneous ideas which are fostered by articles similar to the one from which the examples have just been quoted.

What Do We Know About Steam Railroad Electrification?

SO MANY claims as to the benefits to be derived from electrification are made by its proponents and so many counter claims on behalf of the steam locomotive are put forward by those who seem to oppose the application of electric power on steam roads that some clear thinking is needed if the transportation industry is not to be unduly confused by the discussion. This thinking needs to be done not only by those who make the claims pro and con, but also by those who at present sit by and listen, often with some amusement. The last named group comprises, in general, those who control the expenditure of funds for the railroads.

In a matter so important and far reaching as this there will necessarily be much difference of expert opinion. But opinion alone will not prove the case, and it is fortunate that there exists a mass of data which need no agreement to make them valid and from which conclusions may be drawn. However, progress will be hampered until these data are formulated, and much electrification work will be done under present conditions that could be done better if the experts would get their heads together by a union of minds rather than by locking horns. Meanwhile the best that can be done is to give all possible publicity to such facts as can be secured and to point out what seem to be the most promising lines of development.

Much has been made of the relation of fuel conservation to electrification, and it is at this point, probably, where the greatest difference of opinion lies. And it is with this point that the public is most concerned, because the public wants the fuel reserve to last as long as possible. In a general way it ought to be possible to estimate the saving in coal which electrification would bring about. The present estimates differ so widely as to suggest that the estimators are reasoning from different premises. All agree that some fuel would be saved by electrification, but all do not concede that the saving will justify the cost in most cases. What is needed here is for the railroads that have had experience with electrified lines to furnish data which all will accept and then for the roads having comparable steam-operation conditions to supply data which will also be accepted as comparable.

But even when the railroads have agreed as to the possible fuel savings resulting from electrification they cannot be expected to adopt this means of saving unless they see either a financial profit in the change or an assurance of more reliable operation. The public can, of course, bring pressure to bear upon them, but this would not be just or in the best interests of the public unless the economics of the problem were given due recognition. With the government in control of the railroads the situation would be different, but this would be an unfortunate remedy, one many times worse than the disease. Under present conditions it is difficult to see just how a possible fuel saving is going to influence the railroads much, except where power, and especially water power, is extremely cheap and coal or oil suitable for use on locomotives correspondingly dear.

But after all fuel conservation is not the principal virtue of electrification in this country, although it appears to be so abroad. The principal virtue, in the opinion of the ELECTRIC RAILWAY JOURNAL, is placing at the disposal of the railroads a means of doing certain things which can be done by no other means. Fuel conservation is one of those big, broad questions upon which it is difficult to focus attention except in emergency. But there are acute problems of great variety which have to be faced and solved from time to time and in the solution of which electrification promises assistance.

To illustrate: Take first the case of a new line which must cross a range of mountains. The preferable route may be over the range at a high elevation. Here the possibility of regenerating power, a fascinating one to all railroaders, has the effect of virtually reducing the elevation and making a more direct crossing possible. Thus the Milwaukee climbs over the mountains which the Northern Pacific in part avoids by means of detours.

Closely connected with the above is the matter of grade climbing. Where a road is confronted with a mountain barrier necessitating tunnels, it can by the use of electric power pierce the mountains at higher levels and thus reduce the necessary tunnel length. This fact has been utilized particularly abroad and is a consideration in the proposed "piercing of the Vosges."

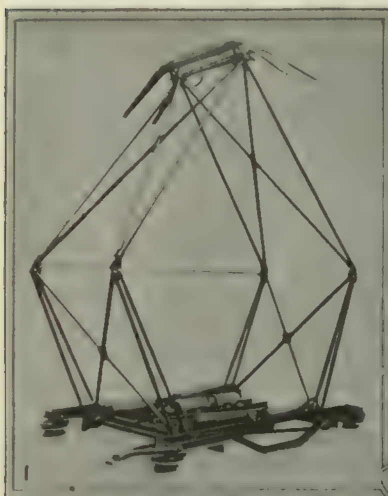
Probably the most pressing problem met by roads with growing traffic in normal times is to take care of the traffic and provide for future growth with minimum cost. Here is where electrification offers most. The term "the neck of the bottle" has come to suggest that part of a railroad system where traffic is held back by track congestion. Electric power helps to get the traffic through the neck of the bottle. The Lackawanna will soon illustrate this on its main line near Scranton, and the Norfolk & Western has been illustrating it for several years. The Pennsylvania, also, must have electric help in crossing the Alleghenies in the state of Pennsylvania and is experimenting with the most powerful locomotive in the world for this purpose. This railroad was confronted at the Philadelphia terminal, some years ago, with an alternative of getting more tracks over the Schuylkill River into Broad Street Station, or getting more service out of existing tracks. The obvious plan was to electrify, and this was done with eminently satisfactory results.

Still another thing that is possible through electrification and not otherwise is the bringing of railroads into the congested sections of large cities. The example for this was set by the Orleans Railway in France in 1900, when the tracks leading to its Quai d'Orsay station in Paris were electrified, and this success led the Pennsylvania to adopt the same plan for New York City, with results of world-wide fame.

The same principle applies in all tunnel and subway operation. Very early in the development of heavy electric traction numerous tunnel propositions were put through. They attracted passing notice and played their parts in the progress of the art but were soon forgotten except by the experts. Thus in 1894 the Baltimore & Ohio tunnel in Baltimore was equipped, and a few years later the Sarnia tunnel of the Grand Trunk, the Cascade tunnel of the Great Northern, the Detroit River tunnel of the Michigan Central, the Hoosac tunnel of the Boston & Maine and the Park Avenue tunnel of the New York Central in New York City. Each of these taught the railroad industry a lesson, the cumulative effect of which is now seen.

A splendid presentation of the great body of information on electrification now available will be made at the great International Railway Congress to be held in Rome within a few weeks. The papers to be read should be studied carefully by all who have the future of transportation in this country at heart.

Details of Electrical Equipment of Passenger Locomotives for Chilean State Railways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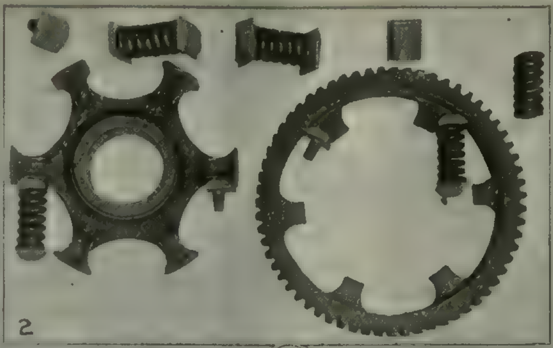
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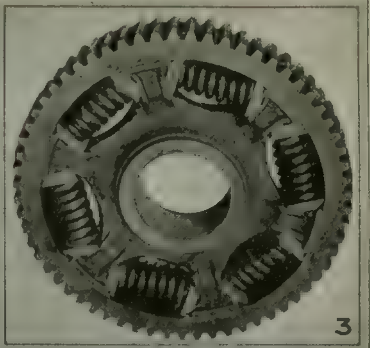
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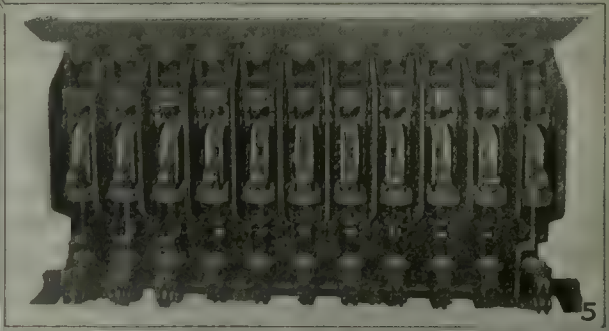
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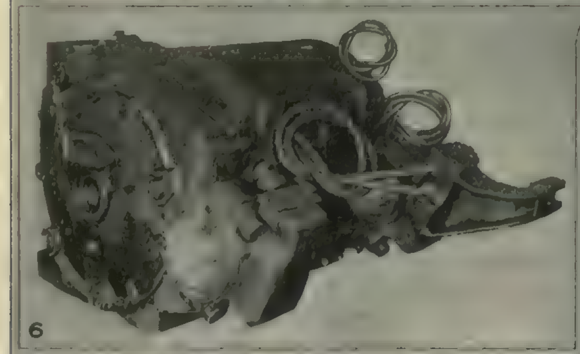
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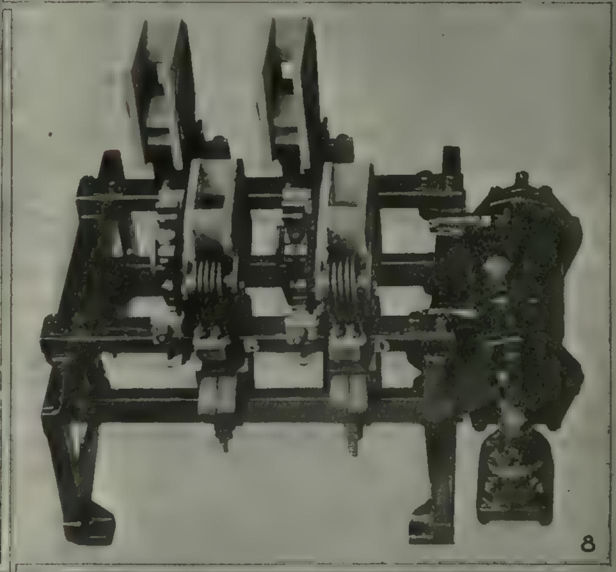
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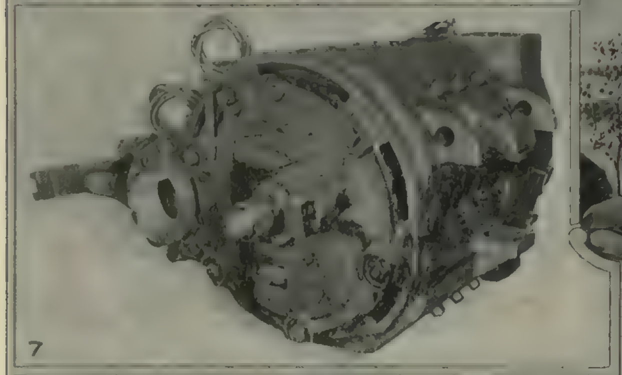
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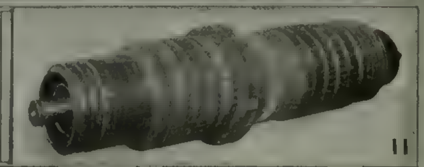
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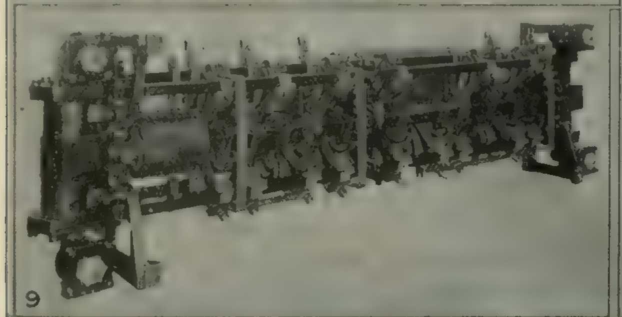
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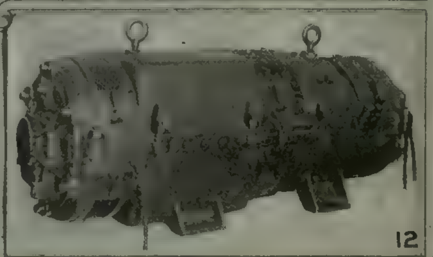
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Nos. 1 and 4—Pantographs are spring-raised, air-lowered and mechanically latched in lowered position. Double shoes are flexibly mounted and equipped with hard-drawn copper renewable wearing strips.

Nos. 2 and 3—Type of flexible gear with which locomotives will be equipped.

No. 5—Type-HL control establishes main circuit connections by use of individual unit switches operated by compressed air.

Nos. 6 and 7—Motors of 375-hp. capacity for express passenger locomotives will be similar in appearance to this one.

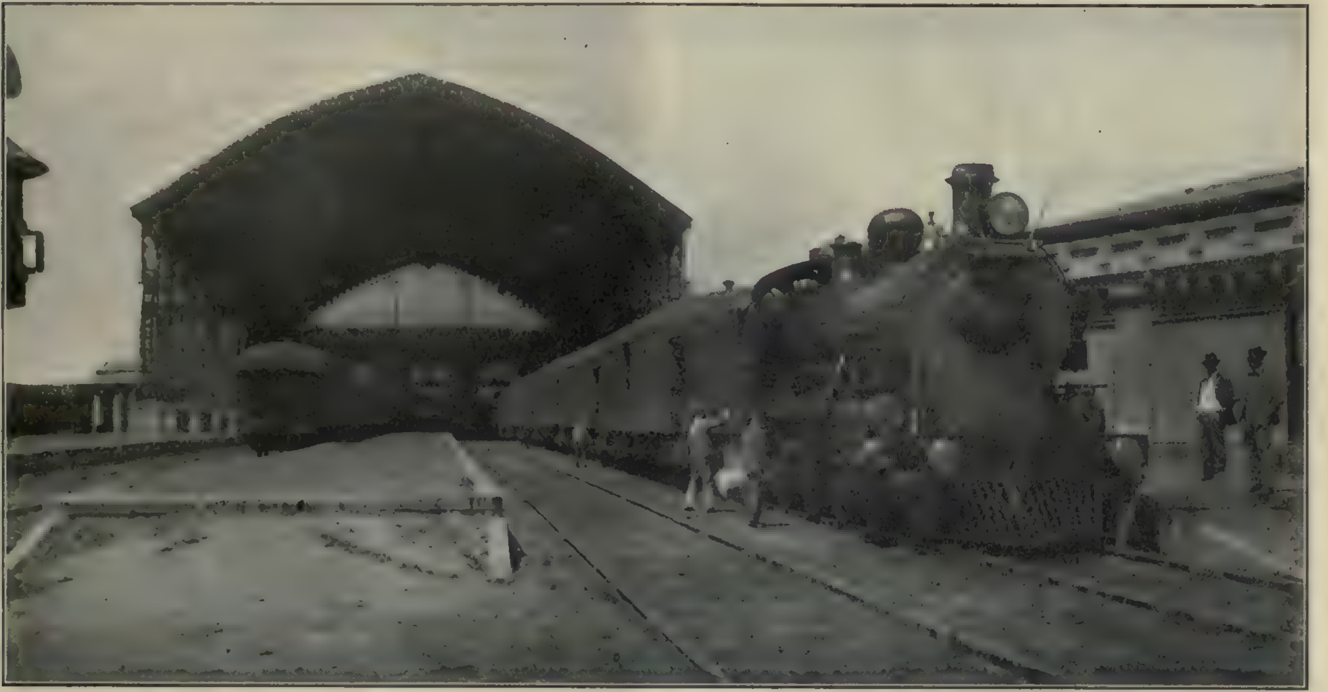
Nos. 8 and 9—Cam-operated switches will be operated by compressed air controlled by electro-magnetic valves.

No. 10—Master controller for express passenger locomotives has total of fifty-one notches available in three combinations. There are four levers, namely, reverse, regenerative, motor combination and speed.

Nos. 11 and 12—(11) Armature of motor-generator sets for express passenger locomotive. Sets are duplicates of those furnished the Chicago, Milwaukee & St. Paul Railway and the Paulista Railway of Brazil. (12) Motor-generator set complete.

Passenger Locomotives for Chilean State Railways

Utilization of Experience with St. Paul and Paulista Locomotives and Interchangeability of Parts Were Features in Design of Passenger Locomotives for Chilean State Railways Electrification —Six Express-Type and Eleven Local-Type Locomotives Now Being Built



RAILWAY STATION AT MAPOCHO, SHOWING TYPE OF LOCOMOTIVE TO BE REPLACED BY ELECTRIC LOCOMOTIVE

THE passenger transportation requirements of the Santiago-Valparaiso-Los Andes section of the Chilean State Railways are most exacting in point of service to the traveling public. The necessity of maintaining unusually high-class service in this zone is due to the character of the passenger traffic being handled, not only between Santiago and Valparaiso but also in the local service from Valparaiso southward. In addition to being the largest cities of the nation, Santiago is the capital and Valparaiso the largest seaport, and therefore naturally a line connecting these two cities is required to provide first-class service. The schedules are rigidly maintained in both local and through service.

The general features of this electrification were covered in the issues of this paper for Dec. 3, 1921, page 991, and Jan. 28, 1922, page 151. The present article covers the passenger locomotives, but before they are taken up in detail some of the operating conditions which they must meet will be given.

Many of the Chilean railway executives have had training in the United States and as a result the present steam locomotives are maintained in line with the best standards in force in America today. In the past a number of the steam locomotives have been constructed in the Baron Shops at Valparaiso, while recently a number of engines have been reconstructed at these shops for passenger service.

Chile has in the past purchased most of her passenger cars in the United States, particularly those for the first-class service and for a large part of the second class service. The passenger cars are of United States standard design and compare with our medium-weight and light-weight cars. They are equipped with Westinghouse air-brake equipment and standard M. C. B. couplers. Each first-class car carries a 32-volt car-lighting outfit consisting of a generator belt-driven from the axle, a battery and a control panel.

The mild temperature conditions prevailing in this section of Chile make the use of steam-heating equipment for the cars unnecessary. This results in reduced weight and cost of the locomotives over what would otherwise have been necessary and in lower operation and maintenance costs as well.

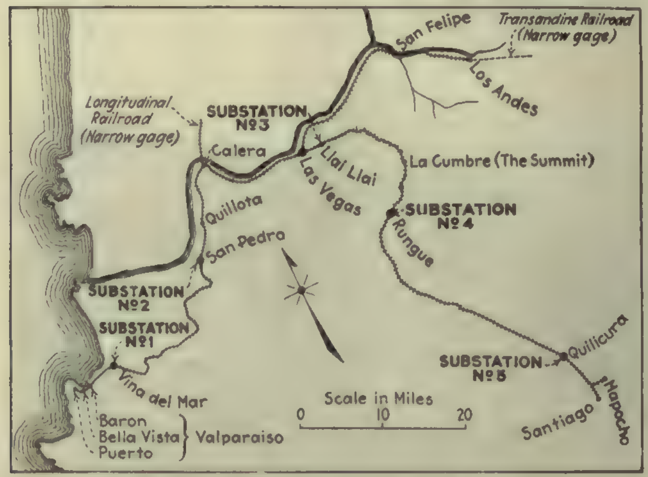
Chair cars are carried by all express trains between Santiago and Valparaiso. Sleeping cars are not operated in this zone at present as the schedules are so arranged as to make this service unnecessary.

The through service between Santiago and Valparaiso is performed by fast express trains and omnibus, or way-passenger trains drawn by Baldwin and North British locomotives assisted by Borsig helpers on the maximum grade sections.

The express passenger trains normally carry six to ten cars in either direction or a trailing load of 200 to 300 short tons. Occasionally, these trains are made up of as many as sixteen cars for excursions, or by combining the regular trains with the trains for the accommodation of the Transandine traffic. The express passenger trains are made up for the accommodation of the first and second class service. They are the fastest trains, making only a few stops in the 116-mile run.

The omnibus trains make all stops between Valparaiso and Santiago. These trains are made up for the first, second and third class service and are the most heavily loaded trains. They usually carry from eight to ten, and frequently twelve cars per train. Helper engines are used on the heavy grade section between Llai Llai and La Cumbre, and occasionally on other sections of the line.

The transition from steam to electric motive power definitely eliminates all helper locomotives in connection with the passenger service, with the exception of trains of unusual weight. The heavy grades in the first zone made it desirable to include the regenerative electric braking type of control on the passenger locomotives for the through service.



ELECTRIFICATION ZONE, CHILEAN STATE RAILWAYS

The local service in the first zone is between Puerto Station, Valparaiso, and intermediate points to Llai Llai, the latter point being 58 miles from Puerto. The most frequent service is between Puerto and El Salto, a run of 8 miles. Other trains run to Quilpue, Limache, Quillota, Calera and Llai Llai. A total of thirteen local trains will depart daily from Puerto under the electrification program and fifteen trains will arrive at this station. A number of the trains carry ten to twelve cars as far as Vina del Mar on the southbound run, dropping several at this point to be picked up on the return trip.

LOCOMOTIVES WILL HAVE REGENERATIVE BRAKING EQUIPMENT

The six Baldwin-Westinghouse electric locomotives which are being built for the express passenger service will be capable of hauling the 300-ton trailing load in either direction between Valparaiso and Santiago in less than the present schedule time with steam service. The present steam train makes a through run in three hours and forty minutes from Santiago to Valparaiso, while it is proposed to make the run with the electric locomotives in three hours and fifteen minutes in this direction or a reduction in running time of twenty-five minutes. In the opposite direction the steam service requires three hours and forty-five minutes, while the electric service will require three hours and twenty minutes or a similar reduction in running time. The electric locomotives are capable of making this run without the aid of helpers, whereas the steam locomotives require helpers on the maximum grade.

A photograph drawing of the express passenger locomotive as it will appear when completed is shown on page 313. An elevation drawing appears on page 312. These locomotives will have a rating of 2,250 hp. at a speed of 37 m.p.h. and a tractive effort of 23,400 lb. The locomotives will weigh 127 short tons, of which 105 short tons will be on the drivers. The wheel arrangement will be 2-6-0 + 0-6-2 consisting of two main trucks, each of which has three driving axles and a two-wheel guiding truck. The cab will be of the single-box type and the motors will be geared direct to the driving axles.

The control equipment is designed for operation of the locomotive from either end, and for regenerative electric braking.

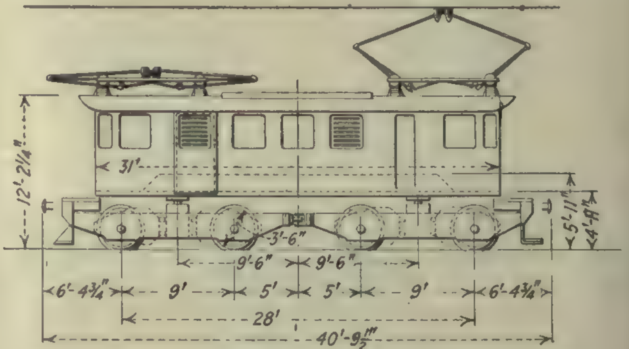
The speed of the express train on level tangent track will be 60 to 62 m.p.h. with 300 tons trailing. The present steam engines are capable of making approximately 54 to 56 m.p.h., depending upon the weight of train. On the Tabon grade, which is 2.25 per cent, the average running speed with the electric locomotive will be 33.5 m.p.h. with a full tonnage train, while with the present steam locomotive the speed on this grade varies between 15 and 20 m.p.h., depending upon the trailing load. The time saving mentioned above for the express passenger locomotive is accomplished not only by higher running speed but by eliminating the delay in taking water, now necessary with the steam service.

TABLE I—EXPRESS PASSENGER LOCOMOTIVE RATINGS

		Tractive Effort (Pounds)	Speed (M.p.h.)	Ventilation
For one hour	75° C. rise with full field.....	28,080	30.2	Natural
	with short field....	23,400	37.0	Natural
Continuous	65° C. rise with full field.....	20,700	33.8	Forced
	with short field....	16,080	43.5	Forced

The greatest saving in running time can be made with the omnibus trains. At the present time these trains make the through run from Valparaiso to Santiago in five hours and ten minutes, whereas with the electric service it is proposed to make the run in four hours and ten minutes, or a reduction in running time of one hour. The reduction in running time in the opposite direction will be approximately fifty minutes.

With 3,000 volts on the line the express passenger ratings will be as in Table I.



ELEVATION DRAWING OF LOCAL PASSENGER LOCOMOTIVES

The maximum tractive effort based on 25 per cent adhesion will be 52,500 lb. The maximum speed will be 62.6 m.p.h. The general dimensions and weights of the locomotive are shown in Table II.

The exceptionally low weight per driving axle, as shown in Table II, is considered to secure material advantage over the present steam locomotives as to track stresses.

One of the important mechanical features of these locomotives is that they will be equipped with M. C. B. couplers and with Continental spring buffers. These couplers will be provided with attachments for chain couplers adaptable for use with the Continental-type drawhooks as now used on the Chilean Railways freight cars. Eventually, however, all drawbar equipment on this system will be changed over to the M. C. B. standard.

The two trucks, each having three driving axles and one idler axle, will be connected at the inner ends by a drawbar held in tension by spring buffers. The frames will be of cast steel, bar type, located outside of the wheels, connected by cast steel bumpers and cross ties, and carried on semi-elliptic springs over the journal driving boxes. The wheels will be of the spoke type and of cast steel with rolled steel tires.

The cab underframe will be of rolled steel shapes running the full length of the cab and connected by cast-steel and rolled-steel cross members. The cab will be 38 ft. long, of the box type, arranged with an operating compartment in each end and an equipment compartment in the center for the control equipment, blowers, motor-generator set and air compressors.

The Westinghouse type 14-EL air brake equipment will be installed on all locomotives purchased on this contract. Straight air is available for handling the locomotives alone and the automatic feature for both locomotive and train. An advantage of this type is the possibility of application of locomotive brakes either independent of or in conjunction with the train brakes.

ELECTRICAL EQUIPMENT OF THE SIX LOCOMOTIVES

The express passenger locomotives will be equipped with six Westinghouse 375-hp. driving motors, with field control geared directly to the axles with Nuttall flexible spur gears. These motors are designed for operation two in series on 3,000 volts. This motor has a one-hour rating of 375 hp. at 210 amp. and 1,500 volts on short field.

The motors will be grouped in three speed combinations. On the lower speeds all six motors will be connected in series, giving one-third speed. For medium speeds, three motors will be connected in series with the two groups in parallel across the line, giving two-thirds speed. For full speed three groups, each with two motors in series, will operate at full line potential. There will be six running positions and the change from one motor combination to another will be made by the shunting method of transition which takes place with only a partial loss of tractive effort. This method also allows all motor fields to be connected next to ground, thus reducing their voltage stresses. At loads corresponding to the continuous ratings of the motor the running speeds for the several combinations are as follows: No. 1 with full field, 10 m.p.h.; No. 1 with short field, 13.4 m.p.h.; No. 2 with full field, 22 m.p.h.; No. 2 with short field, 28.2 m.p.h.; No. 3 with full field, 33.9 m.p.h.; No. 3 with short field, 43.5 m.p.h.

TABLE II—DIMENSIONS AND WEIGHTS OF EXPRESS PASSENGER LOCOMOTIVES

Classification	2-6-0 + 0-6-2
Length over buffers	57 ft. 4 in.
Length over cab	38 ft. 0 in.
Total wheelbase	48 ft. 4 in.
Rigid wheelbase	14 ft. 5 in.
Diameter of driving wheel	42 in.
Diameter of guiding wheel	30 in.
Weight of complete locomotive	253,600 lb.
Weight of mechanical parts	160,000 lb.
Weight of electrical parts	93,600 lb.
Weight per driving axle	35,000 lb.
Weight per guiding axle	21,800 lb.

With any one set of motors cut out, 50 per cent of the locomotive capacity will be available for starting and 66 per cent for running. When the circuit to the main motor is opened, either through manipulation of the master controller or by operation of the overload relay, all of the main resistance will be inserted in the circuit before the final break of the line switches, thus very materially reducing the current to be interrupted and minimizing the consequent arcing at the contacts. This method of rupturing high voltage circuits has proved to be efficient and reliable and obviates the necessity for high-speed circuit breakers on the locomotives.

CONTROL POSITION IN LOCOMOTIVE CAB, SHOWING MASTER CONTROLLER INSTALLED

The main motor armatures will be connected in the same combinations when regenerating as when motoring, the excitation for the motor fields during regeneration being supplied by a constant-voltage motor-generator set.

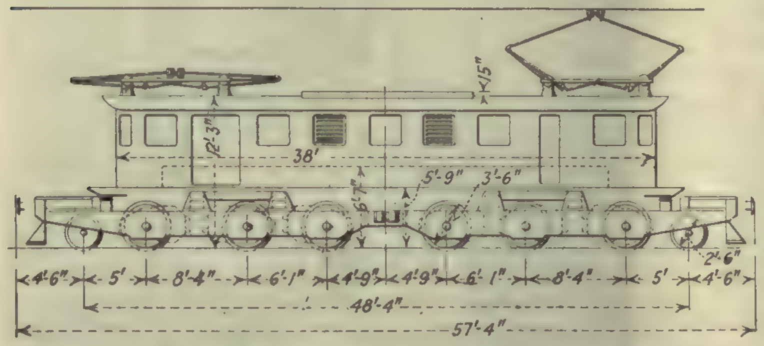
Equal distribution of the load between the motors is assured in this system of control because the same voltage is impressed on all fields, tending to give equal generated voltages. The stabilizing resistance is common to the main generated current and the exciting current and any tendency of one set of armatures to take a larger share of the current reduces the field current of that set and brings about the proper division of load. The stabilizing grids tend to equalize the resistance of the field circuits, which, with equal voltage, gives equal generated voltage. The range of speed in regenerative braking will be from 12½ to 50 m.p.h.

This method of regeneration permits utilizing to the fullest extent the entire weight on drivers. Heavier trains can be held on descending grades than would otherwise be possible and a much greater range of regenerative speeds is available to the operator.

There will be two master controllers. One in each end of the cab, and the same master controller will be used for both motoring and regulating. This controller has four levers as follows: A reverse lever with forward and reverse position; a regenerative lever for adjusting regeneration; a motor combination lever having first, second and third positions, and a speed lever with sixteen resistance notches, one full field notch and one short field notch.

A total of fifty-one notches is available in the three combinations, so that the variation in tractive effort between notches is very small, thereby facilitating control. All levers of the master controller are interlocked.

Westinghouse type-HLF control establishes the main circuit connections by the use of individual unit switches operated by compressed air. The admission of air to and release from the switches is governed by electromagnetic valves. Each switch will be a complete unit in itself and may be independently removed without disturbing adjacent switches.



Outline Elevation Drawing of Express Passenger Locomotive for Chilean State Railways

For these locomotives it has been possible to construct a 3,000-volt unit switch of the same general design as that for standard low-voltage apparatus, using many stock details, but having ample insulation distances, and an improved form of magnetic blowout and arc box construction. Particular attention has been given to the use of uniform parts throughout all locomotives and to convenience for inspection.

Cam-operated switches will be used for certain combination switching and these will be operated by compressed air controlled by electro-magnetic valves. A number of switches will be mounted in a common frame within which are cams mounted on a single shaft. The shaft is connected through a rack-and-pinion to a double-end air engine. The proper application of air to the engine through electro-magnetic valves causes the cam shaft to be rotated, closing or opening the switches in proper sequence.

Each cam switch will be a complete unit in itself which can be removed from the group without disturbing the other switches. A switch is closed by the pressure of a cam on a hardened roller and opened by the action of a spring.

Motor-generator sets will supply low-voltage current for the control equipment, blowers and compressors. This is a two-bearing-type machine with a common frame for both motor and generator. The motor is a bipolar double-commutator machine and will operate direct from the 3,000-volt trolley. The normal rating of the set is 35 kw. at 95 volts, with 3,000 volts at the motor terminals.

A trolley disconnecting switch in one position connects the trolley to the main switch, and in the other position, with the pantograph down, locks it down and connects it to ground. The current collectors are spring-raised, air-lowered and mechanically locked in the lowered position and controlled throughout by compressed air. The double shoes are flexibly mounted and equipped with hard-drawn copper wearing strips, which can easily be replaced when necessary.

Two motor-driven blowers will furnish ventilating air for the main motors.

The meter equipment of these locomotives will include the following on each end: An ammeter indicating motoring or regenerating current per armature; an ammeter indicating field current motoring or regenerating per motor field; a voltmeter indicating line voltage; a duplex air gage indicating main and equalizing reservoir pressures, and a duplex air gage indicating locomotive cylinder and brake-pipe pressure.

ELEVEN ELECTRIC LOCOMOTIVES FOR LOCAL PASSENGER SERVICE

In their general appearance the eleven Baldwin-Westinghouse locomotives which will be furnished for local passenger service are somewhat similar to the express passenger locomotives. An elevation drawing is shown opposite. These locomotives will be capable of hauling a trailing load of 350 tons from Puerto to Vina del Mar and 260 tons from Vina del Mar to Llai Llai and return. Many of the local trains have ten and twelve cars on leaving Puerto, or a trailing weight of 275 to 350 tons. The margin in locomotive capacity over that required to haul 220 tons trailing, specified by the railroad, is very desirable and has been provided to meet the more severe service conditions which have developed. This locomotive will be capable of hauling a 300-ton trailing load from Las Vegas to Los Andes and return.

The local passenger locomotives will have a rating of 1,500 hp., corresponding to a tractive effort of 15,600 lb. at a speed of 37 m.p.h. The maximum tractive effort under starting conditions will be 40,000 lb. and the locomotive will be capable of operating at a maximum speed of 56 m.p.h. This locomotive will weigh 80 tons and the wheel arrangement will be 0-4-0 + 0-4-0, each truck having two driving axles. The cab will be of the single-box type and the motors will be geared direct to the driving axles.

TABLE III—LOCAL PASSENGER LOCOMOTIVE RATINGS

		Tractive Effort (Pounds)	Speed (M.p.h.)	Ventilation
For one hour	75° C. rise with full field......	18,720	30.2	Natural
	short field....	15,600	37.0	Natural
Continuous	65° C. rise with full field......	13,800	33.8	Forced
	short field....	10,720	43.5	Forced

The control equipment is designed for operation of the locomotive from either end. The grade conditions prevailing on the section of the line over which these locomotives will operate are not sufficiently severe to justify the use of regenerative electric braking, as the energy returned to the line would be small and the safety feature is not important.

On level, tangent track the local passenger locomotives will have a free running speed of 56 m.p.h. when hauling a 220-ton trailing load. On the section of line between San Pedro and Llai Llai the average running speed will be 45.3 m.p.h., southbound. The time thus saved will reduce the running time of the local trains between Puerto and El Salto by seven minutes northbound and three minutes southbound and between Puerto and Llai Llai by twenty-five minutes northbound and twenty-three minutes southbound.

With 3,000 volts on the line the locomotive ratings are as in Table III.

The maximum tractive effort based on 25 per cent adhesion will be 40,000 lb. and the maximum speed 56 m.p.h. The general dimensions and weights of the locomotive are shown in Table IV.

TABLE IV—DIMENSIONS AND WEIGHTS OF LOCAL PASSENGER LOCOMOTIVES

Classification	0-4-0 + 0-4-0
Length over buffers	40 ft. 9½ in.
Length over cab	31 ft. 0 in.
Total wheelbase	28 ft. 0 in
Rigid wheelbase	9 ft. 0 in.
Diameter of driving wheel	42 in.
Weight of complete locomotive	160,000 lb.
Weight of mechanical parts	96,000 lb.
Weight of electrical equipment	64,000 lb.
Weight per driving axle	40,000 lb.

The two trucks, each having two driving axles, will be connected at the inner ends by an articulated coupling in the form of a Mallet hinge. The frames and wheels will be of the same type and construction as on the express passenger locomotives. The cab will be 31 ft. long and in all other respects similar to the express passenger locomotive cab. The couplers and brake equipment will also be the same.

ELECTRICAL EQUIPMENT OF THE "LOCALS"

The local passenger locomotives will be equipped with four Westinghouse 375-hp. driving motors, duplicates of those used on the express passenger locomotives and geared directly to the axle with Nuttall flexible spur gears. These motors, like those on the express passenger locomotives, are designed for operation two in series on 3,000 volts and have an hour rating of 375 hp. at 210 amp. and 1,500 volts on short field.

The control of these locomotives is arranged to obtain two separate combinations by connecting the motors in series and in parallel and additional speed variations are obtained by varying the fields of the motors. At loads corresponding to the continuous ratings of the motors the running speeds for the several combinations will be as follows: No. 1 with full field, 16.2 m.p.h.; No. 1 with short field, 21.1 m.p.h.; No. 2 with full field, 33.9 m.p.h.; No. 2 with short field, 43.5 m.p.h.

The changes from one motor combination to another will be made by the shunting method of transition as in the case of the control on the express passenger locomotives. There will be two master controllers, one in each end of the cab, each controller having two levers, namely, speed lever and reverse lever. Inasmuch as the local passenger locomotives are not arranged for regenerative control, the master controllers differ in that all speed variations are secured by the continuous movement of a single handle. A total of twenty-three notches is available in the two combinations so that the variation in tractive effort between notches is very small, thereby producing minimum stresses on the drawbar equipment. Both levers of the master controller will be thoroughly interlocked.

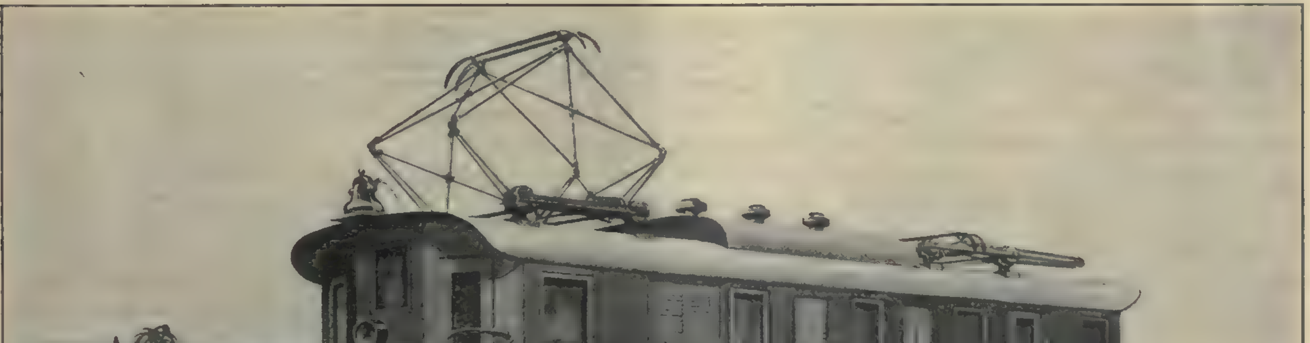
The high-voltage-switch and cam-switch units will be duplicates of those already described for the express locomotives.

The motor-generator set will be a double-armature machine, each armature consisting of a motor and a generator. The motors will be connected in series and will operate from 3,000 volts. The generators will be connected in parallel and will divide the load equally. The normal rating of the set will be 22.5 kw. at 95 volts with 3,000 volts at the motor terminals. This will supply current for the blower and compressor motor and for the control circuits.

The trolley disconnecting switch and the current collectors will be the same as those used on the express passenger locomotives and already described.

One motor-driven blower will furnish ventilating air for the main motors.

The meter equipment will be similar to that on the



EXPRESS PASSENGER LOCOMOTIVE FOR CHILEAN STATE RAILWAYS express passenger locomotives, without the ammeter indicating field current.

The following parts are interchangeable between express passenger and local passenger locomotives: Air-brake equipment, blowers, buffers, cab doors, windows and hardware, cam-operated switches, couplers, current collectors, draft gear, driving axles, driving boxes, driving brasses, driving tires, driving wheels, high-voltage switches, lightning arresters, low-voltage switches, miscellaneous control parts, motors, motor suspension, wearing gibs and shoes, wheel hub liners. This interchangeability of parts between locomotives will permit carrying small stocks of renewal parts, will facilitate maintenance of locomotives and keep down maintenance costs.

Electrification a Question of Financial Soundness

Economic Efficiency Determines the Practicability of Electrification and Choice of System—Figures Are Given for Steam and Electric Working on Several English Railways

THE sole criterion of the practicability of electrification is its financial soundness, was the point made by Sir Philip Dawson in an address recently delivered before a section of the Institution of Electrical Engineers of London, according to an abstract of his paper in the *Electrical Times*. The selection of a suitable system should be made from the broadest standpoint, due regard being paid to the conditions of service. For example, although a low-tension direct-current system requires many more substations than does an alternating-current system, Sir Philip said that this extra expenditure is justifiable where the trafic is of sufficient volume to keep each substation operating at a good load factor. At the request of the English Ministry of Transport some interesting data dealing with relative costs and weights were collected by careful investigation of actual working over a considerable period.

In his address Sir Philip presented comparisons on the subject of alternating current versus direct current, the former figures being provided by the London, Brighton & South Coast Railway, while the latter are taken from a collection of figures from the various direct-current systems in operation in England. The service on the London, Brighton & South Coast Railway is not as frequent as that of the London tube railways, but the direct-current figures include railways such as the Manchester-Bury and the L. & N. W., the services of which are of the same nature as that of the Brighton Railway.

The cost of installing a low-tension direct-current system today, including cables, substations, bonding, signaling, etc., is about £10,000 per mile of single track. In the extension of the Brighton Railway (alternating current) the corresponding outlay is only about £6,000. The cost of operating per car-mile for direct current varies from 4.5d. to 11.2d., the alternating current cost being 9.7d., with the same price assumed per high-tension unit. The same figures for operating costs per ton-mile are from 0.14d. to 0.297d. and 0.224d. respectively. These figures show that alternating current strikes the happy medium in operating cost, while the initial cost is substantially lower.

It is often stated that alternating-current equipment is much heavier than direct-current machinery developing the same power. The following figures show that this is not the case:

Railway	Weight of Electrical Equipment Per Cent of Total Weight	No. of Cars per Train (Average)
Liverpool & Southport	20	4.24
Manchester-Bury	27.3	3.91
L. & N. W.	18	5.2
L. & S. W.	19	4.5
Metropolitan	23	4.6
District	17.3	4.87
L., B. & S. C. R.	21	4.3

The London, Brighton & South Coast Railway has prepared from its records a comparison of the cost of working a system under steam and electric power. The figures are taken from experience, and are all agreed to by each department.

The cost of running, inclusive of maintenance of rolling stock, staffing, etc., per train-mile is as follows:

	Steam d.	Electric d.
Local passenger	50.51	27.58
Local goods	108.083	64.084
Through passenger	41.769	26.741
Through goods	66.054	52.028

In the above comparison the average coaches per train were 6.6 in the case of steam and 4.4 for electric trains. This does not invalidate the comparison, however, since it is not economical to run steam trains with less than six or seven coaches, whereas the fewer coaches making up an electric train the cheaper it is to run.

Perhaps the chief advantage of electric traction is the greater traffic capacity of the line. This is fully demonstrated by the following figures. The average suburban train speeds are 9.31 m.p.h. for steam and 21.8 in the case of electric trains. The seating capacities being 462 and 308 respectively, the seat-miles-per-hour figures are 4,300 and 6,714, thus showing a considerably greater carrying capacity with electric trains.

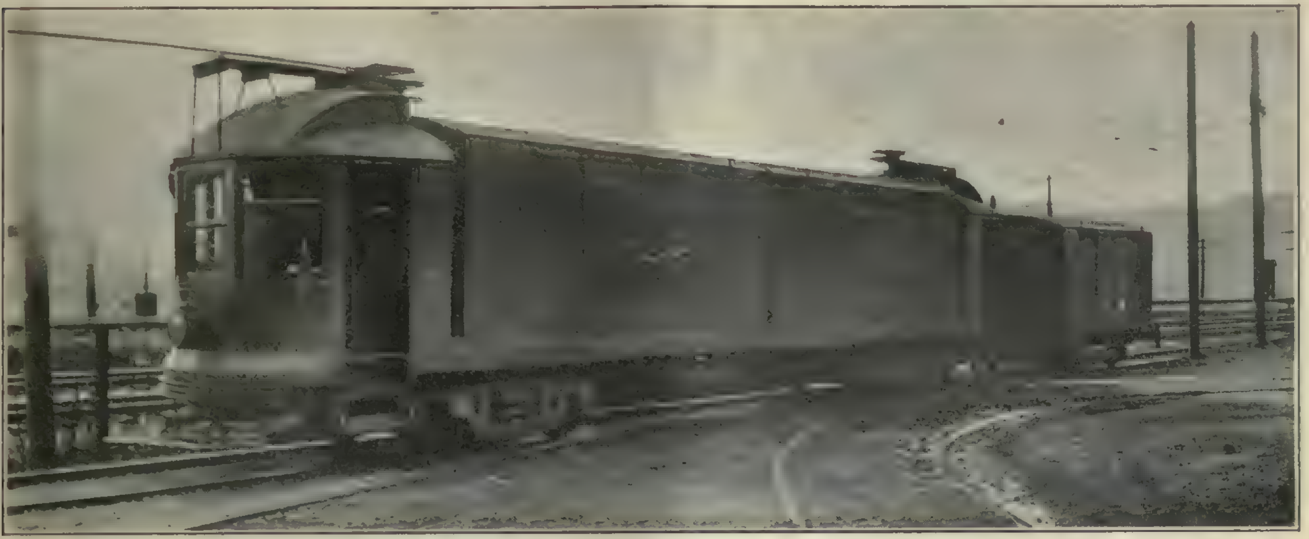
Again, an electric locomotive is advantageous from the maintenance point of view. A steam locomotive is in service for sixteen hours per day only and requires docking at frequent intervals. In practice the net hours per annum in service are found to be 4,800 out of 8,760 for a steam locomotive, whereas the figure for electric locomotives is 7,700.

The electric shunting locomotive also effects considerable economy, since the time the locomotive requires power is only about 28 per cent of the total. Moreover, the electric locomotive can attain an average speed of 5 m.p.h., as against 2.7 for a steam locomotive.

Confirmation of these results is afforded by those obtained on the St. Gothard line, showing the effect of electrification in speeding up the service. The maximum gradient to be surmounted is 2.5 per cent. The times taken for the journey are as follows:

	Southward Journey		Northward Journey	
	Steam, Minutes	Electric, Minutes	Steam, Minutes	Electric, Minutes
Through passenger	55	34	80	50
Stopping passenger	70	45	122	76
Through freight	90	50	130	80

It will be seen from these data that, for the class of service considered, electrification has very material advantages, and that, apart from the increase in carrying capacity of the line, the running cost, if the scheme is properly organized, is considerably lower than with steam working.



Trolley Car with Two Containers and Trailer with One Container Arriving at Anderson's Ferry Freight Station, Where Containers Will Be Taken by Motor Truck to Cincinnati

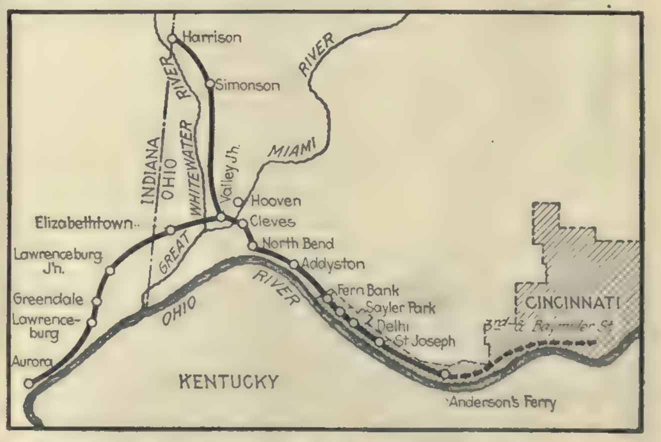
Containers Carry Freight in Cincinnati

An Interurban Electric Railway Without Tracks Downtown Gives Through Freight Service by Containers Which Are Carried on Motor Trucks Within the City and on Electric Cars for the Interurban Run

THE latest company in Cincinnati to establish a freight container system is the Cincinnati, Lawrenceburg & Aurora Street Railroad. The equipment includes a small, inexpensive off-track freight station downtown in Cincinnati, an automobile transfer system between this station and the company's track terminus some distance from the center of the city, and a set of containers and motor trucks. The motor truck equipment and service is furnished by the Cincinnati Motor Terminals Company, utilizing the same system employed by that company in the interchange of less-than-carload freight between the twenty-eight main stations and sub-stations of all the railroads entering Cincinnati. Until the introduction of this system, the Cincinnati, Lawrenceburg & Aurora had handled no freight, being handicapped by the fact that it is of standard gage and its lines terminate at an outlying point known as Anderson's Ferry, where passengers transfer to the broad-gage lines of the Cincinnati Street Railway to reach the center of the city. However, the plan is being considered to extend the company's tracks to the new Dixie Passenger Terminal at Fourth and Walnut Streets, Cincinnati. Some particulars of this freight container system were published in the issue of this paper for Nov. 26, 1921, but additional information now available will be given.

The off-track downtown freight station is at Third and Baymiller Streets, in the central originating zone of Cincinnati. This freight station is equipped with a simple superstructure, carrying an electric hoist for handling the demountable containers. Here freight is received from and delivered to shippers. It is conveyed between this station and the Anderson's Ferry rail transfer station in containers carried by truck. At the transfer station the containers are mechanically interchanged between the motor truck and an electric flat car by an electric hoist also carried on a superstructure. The electric flat car has a capacity for carrying two containers, each of 5 tons capacity, and hauls a trailer carrying one container.

From Anderson's Ferry, as shown in the accompanying map, sixteen rail destinations are reached in a territory previously served largely by long-distance motor trucking and by steam-line l.c.l. and partial river transportation. With the new service, freight received at the Cincinnati downtown station at noon is delivered at the end of the line, 30 miles distant, at 3 p.m. at rates to shippers identical with interstate steam-line freight rates and, of course, in much shorter time.



Map of Cincinnati, Lawrenceburg & Aurora Street Railway

Freight received from shippers' trucks and drays at the off-track downtown station platform is run into containers by hand truck through end doors and is stowed in line station order to facilitate quick side-door unloading of the individual consignments at the various rail destinations. Lading and way bills are made out at the receiving station for each consignment, and an abstract of the shipments in each container is made out from way bills. The truck driver of the terminals

The Containers Are Lifted Easily by Two Men Through the Use of Overhead Electric Traveling Cranes

The Containers Leave the Downtown Terminal at 12 O'Clock Sharp and Are Hoisted by Crane Onto the Motor Truck

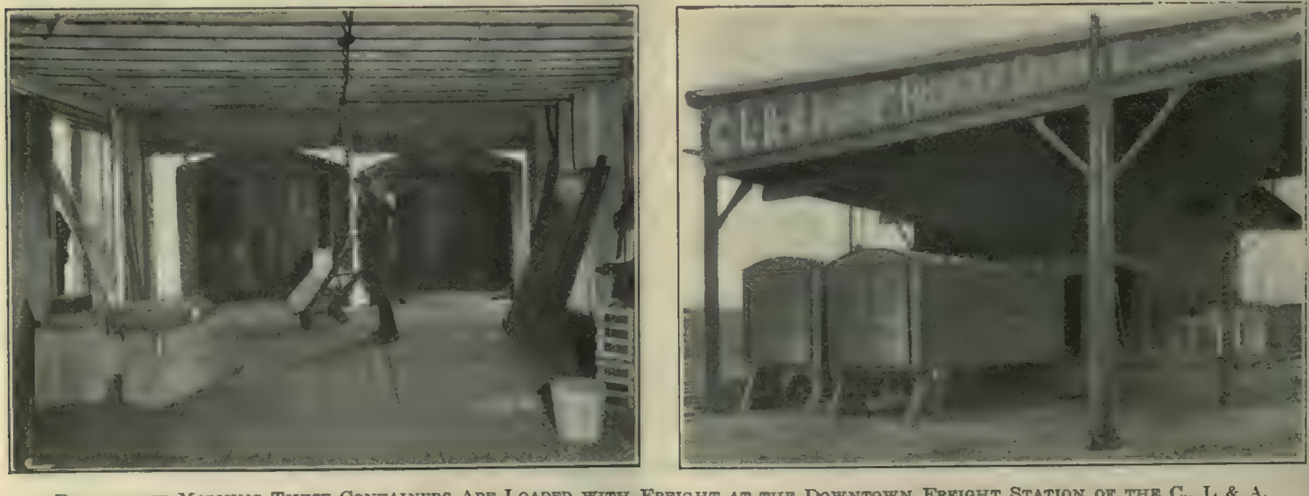
company receipts for the container load, as represented by the abstract, of which he takes two copies, together with the corresponding way bills, to the rail transfer station. He retains one receipted copy of the abstract when his load is delivered at this outside station. All freight carried in containers by the terminals company is under the railroad's seal.

While the service is growing, it was started such a short time ago that at present the freight each way needs usually but two of the three containers provided. The usual routine followed with these containers is as follows: Two truck chassis arrive at the downtown station at 11:55 a.m. on regular schedule and pick up the two containers which have been loaded there, one with outgoing freight for the main line and one with outgoing freight for the Harrison branch. After these containers are loaded on the motor trucks they leave the downtown station at 12 o'clock noon. At 12:40 these trucks arrive at the transfer station, where the demountable containers are exchanged for incoming return-load containers which have arrived on the flat car and trailer. The distance between the Third and Baymiller Streets station and the Anderson's Ferry station is 6.1 miles through 1½ miles of city traffic and over a curving route, reaching an elevation of about 175 ft.

Before the trucks arrive at the rail transfer, the two-man crew of the container train has already mechanically unloaded the incoming containers from the flat car and placed them on wooden horses, awaiting the arrival of the trucks. When they come, the train crew loads the outbound containers from the truck to flat car or trailer and then transfers the return containers from the horses to the trucks. Five minutes per container is allowed for these two mechanical interchange movements, and the trucks are due back at the downtown station with their return load at 1:30 p.m. The chassis are then released for use at the Cincinnati steam line freight interchange service at 1:35. The containers returned to the downtown station are set on horses under the superstructure roof adjacent to the inside station platform. The return load freight is hand-trucked from the containers to the station platform, awaiting consignees' call. Space is provided for three bodies or containers, so that one is always available for outbound loading by hand truck from shippers' trucks or drays.

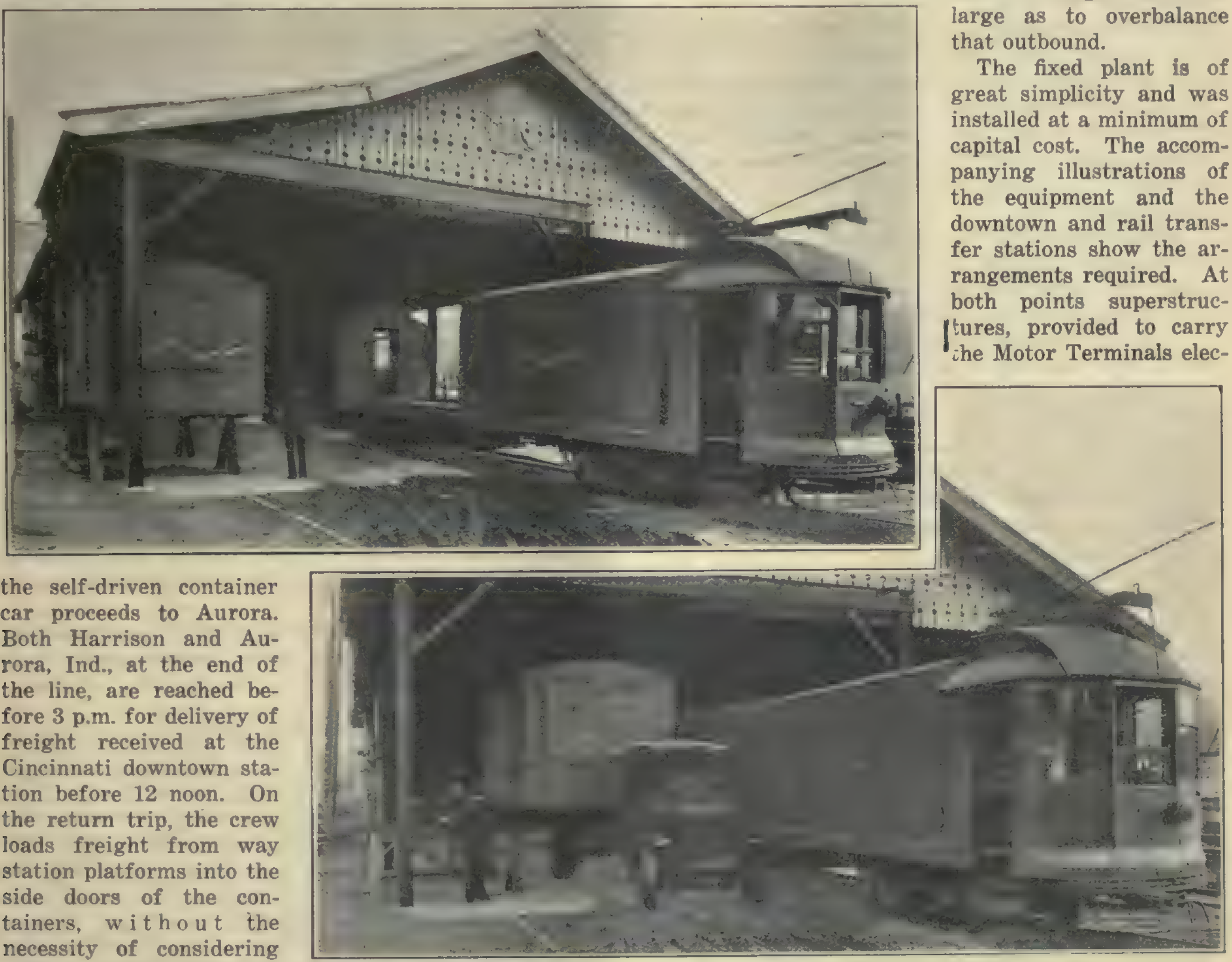
Train Operation Is by Two Men

The container train is operated by a crew consisting of motorman and conductor. This two-man crew handles the containers by hoist at the rail-motor-truck-transfer station at Anderson's Ferry and unloads the freight from the containers at the various line destina-



During the Morning These Containers Are Loaded with Freight at the Downtown Freight Station of the C., L & A. Railroad, Later to Be Taken 6 Miles by Motor Truck and Transferred to the Electric Car tions. The crew also makes store-door deliveries and collections of light consignments to and from shippers adjacent to rails. If, as at present is usually the case, there is one container of freight for Aurora and one for Harrison, the second container on the motor flat car starts from Anderson's Ferry as an empty, but is used to receive volume commodities at local way points. Thus one container functions on the main division for outbound unloading and the other container for inbound reloading.

At Valley Junction the trailer is dropped off for haul over the Harrison branch by a passenger car, and the self-driven container car proceeds to Aurora. Both Harrison and Aurora, Ind., at the end of the line, are reached before 3 p.m. for delivery of freight received at the Cincinnati downtown station before 12 noon. On the return trip, the crew loads freight from way station platforms into the side doors of the containers, without the necessity of considering station order, since all consignments are segregated upon receipt at the station in the Cincinnati downtown business district.



THESE VIEWS ILLUSTRATE HOW A CONTAINER IS LIFTED OFF THE ELECTRIC CAR AND SET ON HORSES AND HOW IT IS LATER LIFTED FROM THE HORSES ONTO THE MOTOR TRUCK

In addition to the regular run of business, retail dealers along the line are using the service to secure emergency shipments from Cincinnati wholesalers and jobbers to cover shortages for special customers' calls. The procedure is as follows:

The dealer telephones his requirements to the nearest line way station, from which it is relayed by the railroad's private wire to the Cincinnati station. The agent here transmits the call to the wholesaler, who delivers the consignment to the downtown station. Thus a shipment requested by a retailer at the end of the line before 11 a.m. will reach him before 3 p.m. the same day. This special service is now in daily use.

Since the inauguration of the service on Aug. 17, 1921, both outbound and inbound business has increased rapidly. By Jan. 10, 1922, a sustained daily average of 9,000 lb. outbound had been reached, in addition to fluctuating inbound agricultural commodity movements of from 1,000 lb. to 12,000 lb. Records for recent typical days are given in the accompanying table. It is expected that by spring or midsummer the amount of inbound freight will be so large as to overbalance that outbound.

	Inbound	Outbound	Total
Jan. 24	9,030 lb.	4,592 lb.	13,622 lb.
Jan 25	13,100 lb.	8,759 lb.	21,859 lb.
Feb. 1	1,700 lb.	11,569 lb.	13,269 lb.

The fixed plant is of great simplicity and was installed at a minimum of capital cost. The accompanying illustrations of the equipment and the downtown and rail transfer stations show the arrangements required. At both points superstructures, provided to carry the Motor Terminals electric hoists, are of standard I-beams and channel sections with 10-in. channels, serving both as beams and rails for hoists.

The outside platform at the downtown station has an area of 382½ sq.ft. and the inside platform of 748½ sq.ft., exclusive of the small office at the rear. This floor area is extended to 1,028½ sq.ft. by the addition of 280 sq.ft. provided by floor area of two bodies. It is estimated by the Cincinnati Motor Terminals Company that this fixed plant is capable of passing 160 tons of freight per eight-hour shift, so that considerable expansion of the business is possible with present facilities.

A similar superstructure was built at the rail transfer station except that channel trolley rails extend over the loading track. It was necessary only to raise the roof of the old passenger shed slightly, and it was possible to do this without any interference to the structure or service.

ROLLING STOCK

The mobile equipment consists of two 5-ton truck chassis employed only one hour and thirty-five minutes a day, six bodies or unit containers and a flat car and trailer. The truck and containers are of the same standard as those employed in Cincinnati for steam-line l.c.l. interchange service, except that the bodies are provided with sliding side doors. For this purpose angles are extended back from the doors at the top and bottom on the side of the container, and the door is divided at the center with a door stop arrangement similar to that in the ordinary box car. This alteration was made at minimum expense, and required only the flattening of the rivets which secure the steel side straps of the containers to permit perfectly free movement of the doors. The containers measure 17 ft. 6 in. long, 8 ft. wide and 7 ft. 3½ in. high, inside dimensions.

The electrically driven container flat car has a controller and trolley at both ends. An old passenger car that would otherwise have been scrapped was remodeled for this purpose, at a total cost of approximately $500, by removing the body and cutting the side sills in the middle and splicing them to extend the length about 3 ft. to provide platform length for two containers. Steel angles 3 in. x 3 in. are secured to the floor of the car, laterally and longitudinally, to hold the containers securely. The car is 59½ ft. over all in length and is equipped with four motors. The trail car consists of a simple steel frame 20 ft. long, to carry one container on a single truck.

It has been pointed out by B. F. Fitch, president of the Motor Terminals Company, that the next logical extension of the service would be the establishment of farmers' off-track stations near or on the line. Such platform stations would serve as receiving and assembly points of farm products and also as delivery points for unit-load consignments of shipments destined to rural districts. If away from the line the containers could be hauled to the nearest rail stations by motor trucks. It is emphasized that such practice would tend directly to improve highway maintenance conditions by removing in so far as possible long-distance trucking from the highways, as the loaded unit-containers would be hauled by rail the maximum possible distance.

The rates charged to shippers for the freight service described average about 45 cents per 100 lb., according to distance and commodity classifications, and are identical with steam-line rates—for a service that has proved faster than express. The motor truck service, containers and hoists used are leased to the Cincinnati, Lawrenceburg & Aurora Railroad by the Cincinnati Motor Terminals Company.

Trolley Bus Pictures Reversed

IN TWO views of trolley buses on page 233 of the issue of Feb. 11 the captions became transposed in the printing office. Actually the view on the left showed the trolley bus built by the St. Louis Car Company and equipped with Westinghouse motors and foot control. That on the right illustrated the Packard automobile chassis with Kuhlman body and the same type of motors and control.

Manager Talks to Men

Brooklyn City Officials Address Employees at Series of Meetings on Means of Securing Better Operating Efficiency

CLINTON E. MORGAN, general manager Brooklyn City Railroad, at a series of day and night mass meetings, is addressing the 7,000 surface line workers in an effort to humanize the electric railway industry there. The men of both the Brooklyn City and the Brooklyn Rapid Transit organizations are being assembled at the various carhouses and Mr. Morgan is urging close co-operation between management and labor in the interest of the companies and the public.

Mr. Morgan and his associates look for a new era in the labor situation on the Brooklyn surface system. Heads of departments are joining him in a plan to link the executive offices more closely with the power house and the carhouse. Dozens of speeches have been made and the response has been immediate and emphatic.

The Brooklyn surface lines are operated as a unit under H. Hobart Porter as vice-president. Concrete advantages in improved morale are being reflected in fewer accidents and quicker service. One of the biggest things to be achieved is the cutting down of the number of accidents, which, it was revealed, are using up 5 per cent of the surface line receipts. Fewer complaints are being received than formerly was the case, and they are outweighed by the number of commendatory letters and messages—a practically unprecedented condition in the Brooklyn railways.

William Siebert, superintendent of surface transportation and a veteran of many years in Brooklyn traction service, is aiding Mr. Morgan. Others who are taking part in the campaign are the division superintendents and the executive staffs of the Brooklyn City and the Brooklyn Rapid Transit.

The meetings are being held at the various depots, though often there is a joint assemblage from two depots at one meeting.

DEVELOPMENT OF PERSONAL RESPONSIBILITY SOUGHT

Personal responsibility is being stressed by Mr. Morgan and his associates. He is continually urging the men on the cars to take an active individual interest in the daily task of providing adequate surface transportation. The methods now being applied by Mr. Morgan in Brooklyn are similar to ones which proved very successful in their application to lines operated under his direction in the Middle West, particularly in Michigan and Indiana. He is confident of the outcome of their use in Brooklyn.

Mr. Morgan declared that this was not a sporadic effort designed to relieve the temporary condition, but a matter of fixed policy. He saw no reason why the army of Brooklyn surface workers could not be welded into an organization 100 per cent effective in the interests of the vast community which it serves. He also looks upon his work as one of a progressive series of elements which will eventually make for a solution of the vexatious traction difficulties of New York. Mr. Morgan said:

> The situation when I came to Brooklyn a little more than two years ago was a good deal like a wake. Our railroad property was almost dead. It was as a corpse laid out and we did not know whether to put a sheet on it and bury it or try to bring it to life again. Some of the limbs of this tree became decayed and Receiver Garrison had to clip them off because the trunk could not carry

the load. Fortunately, the sun is going to shine behind this cloud before very long. Through co-operation we will all take hold of the wheel, whether it has a little mud on it or not, and hang on until we roll the whole thing over.

The job of the whole surface line organization, Mr. Morgan emphasizes, is to sell transportation, which he characterizes as "the business of moving a person or a commodity between two points in the shortest possible time with safety and comfort." Every man in the organization, he added, is a salesman. Courtesy and control of the temper are things which, he said, the management would insist upon. Comments on the need for good service follow:

> We must give service, rain or shine, twenty-four hours a day and 365 days in the year, because that is what the millions of the riding public have a right to expect of us. We are the servants of the public. We are classed exceptionally as a public utility and it is up to us to render the service because this public is paying for it.

TRAINING MEN RECEIVES GREATER ATTENTION

Greater care is being taken to break in new men on the Brooklyn surface system. In the old days, it was said, the training was not such as to promote efficiency or co-operation. Now, great pains are being taken to teach the newcomer every essential of the operation of a car. Avoidance of delays is being urged by Mr. Morgan on the motormen. Mr. Morgan's message to his men is:

> Motormen can do a whole lot to improve the service. Watch the people on the street and try to stop for them so that there will be less delay. Do not try to hit all the mud holes, but when you make a stop do not run up against the rock of Gibraltar. Let us make decent stops. Do not annoy passengers. They don't like to have the backs of their necks snapped off.

Dealing with taxes, Mr. Morgan cited figures to show the difficulty encountered by the electric railway, because of their relative inability to pass the increase on to the consumer. Taxes on the electric railways, he said, are almost 18 per cent of the gross receipts. Paving takes 4½ to 5 per cent more. In explaining this matter to the men Mr. Morgan said:

> You pay the franchise tax; you pay $20 a year for every car you run in addition to other taxes, and when the state legislative investigators got into this thing they found that big industrial plants pay only about 4½ per cent of their gross earnings and some of them made real money during the war; yet the electric railway pays from 15 to 18 per cent and further must pay an income tax on gross earnings no matter whether you have spent it or not.

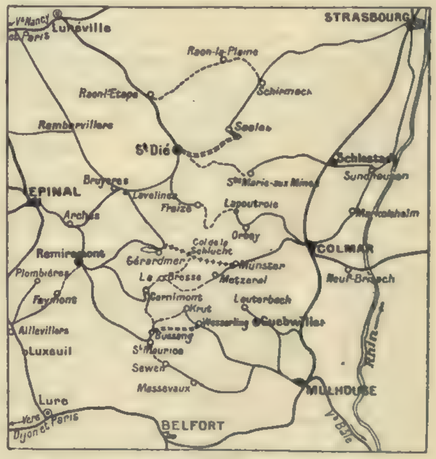
Every day in the year except Sunday the Brooklyn surface lines carry more than 1,000,000 passengers. Stressing the need of vigilance, Mr. Morgan quoted a report of Superintendent Siebert which said that on a foggy day recently, when the rails were bad, only eleven wagons were struck by cars. During the next day, although it was clear, forty wagons were hit. The reason for this, Mr. Morgan explained, was the state of mind of the motorman. Records show that in lower Fulton Street, in lower Broadway and at the Brooklyn and Williamsburg Bridges, points of heavy traffic congestion, there are very few accidents. This is because the men know they must be careful.

Both Mr. Morgan and Mr. Siebert are cautioning the men against the influence of old and discredited aphorisms which have long been a part of the surface worker's stock of tradition. "Nobody is a motorman until he hits a wagon or a car," was pointed out as a trite saying that is full of danger. Both Mr. Morgan and Mr. Siebert reminded the men that it costs money to hit the wagons. Five per cent of the receipts of the Brooklyn surface lines are paid out for accidents, they told the men, and added that if the company had to pay out from its gross receipts only 2 or 2½ per cent through accidents, "would there not be a chance for you to get some of it?"

Joining Railway Lines in French Vosges Region

Conditions Following the Peace Treaty Render Desirable the Connecting of Alsace-Lorraine with the French Territory to the West—Only a Meager Connection Is Available Now

BEFORE the war strategic conditions interfered with the junction of the railway lines in the Vosges Mountains on the French and Alsatian borders. A recent issue of *Le Génie Civil* explains that outside of the main lines connecting Paris, Nancy and Strasbourg to the north of the mountains, and Paris, Belfort, Mulhouse and Bale, to the south, there was no direct connection between the short lines of the eastern system which stopped at Fraize, Gérardmer, Cornimont, Dussang, on the one hand, and those of the Alsace-Lorraine system which stopped at Saales, Sainte-Marie-aux-Mines, Lapoutroie, Metzeral, Lautend Krut and Sewen. A convenient arrangement for tourists, but one without commercial importance, was, however, established through the Schlucht Pass by two tramways, respectively, from Gérardmer to Schlucht and from Schlucht to Munster, which met at the frontier. Soon after the war the desirability of making several junctions between these railway lines was recognized, and schemes were evolved which have been called, rather inaccurately, "piercing the Vosges." This could only be done literally by means of great tunnels comparable with those of the Alps. The easiest of these junctions, that from Sainte-Die to the Saales-Schirmeck-Strasbourg lines, which descend the valley of the Bruche, was quickly decided upon. This work is now reported to be well along.



RAILWAY LINES IN VOSGES REGION, ALSACE-LORRAINE BORDER

Key: Heavy dotted line, tramways connecting across border, Gérardmer to Schlucht and Schlucht to Munster.

Double dash line, lines authorized by the law of March, 1920.

Light dotted line, projected lines.

There are many other plans under consideration. A mass meeting to consider some of them was held at Colmar in September, 1921. This "Colmar Congress" supported the simultaneous construction of two lines, Saint-Die-Sainte-Marie and Cornimont-Metzeral, to cost about 35,000,000 francs. The plan is to utilize the fact that electrification, which permits the use of steeper grades than steam operation, will provide for the crossing of the Vosges at high altitude. This will reduce the necessity for constructing long tunnels and consequently will be much less expensive.

Electric Railway Publicity

Devoted to How to Tell the Story

Does Publicity Produce Results?

BY E. F. KELLEY

Secretary Kentucky Association of Public Utilities and Editor of the *News Service Bulletin*

THE question "Does Publicity Produce Results?" has been passed back and forth a good many times in the past few years, following the inauguration of various state committees on public utility information. A local operator of public utilities walked into my office a few days ago and observing that the *News Service Bulletin* of the Kentucky Committee on Public Utility Information was in course of preparation remarked:

> Do you really think that sort of publicity produces results? Does it really get your story where you want it to go? Do you really labor under the delusion that the busy editor of any fair sized newspaper is going to take the time to read that over, to say nothing of taking valuable space in his news columns to publish any portion of it?

My only answer to the gentleman was to pass across the desk the following from the Louisville *Evening Times* of Jan. 19, 1922, which appeared in the editorial columns under the caption, "Public Utilities":

> Several interesting thoughts are carried by the news bulletin of the Kentucky Committee on Public Utility Information. On the subject of publicity for the affairs of corporations serving the people, James P. Barnes, president of the Louisville Railway, speaks clearly and with emphasis. He would have the customers taken into the confidence of the merchants of service.
>
> The old spirit of the public-be-damned has gone flickering as the discovery has become general among business men that the people are able to take a considerate interest in the welfare of business agencies supplying them with transportation or light or fuel. The unreasonableness sometimes displayed by the public in dealing with corporations was largely due to misunderstanding. It was supposed that the profits were immense and that nothing but niggardliness prevented infinite improvement in accommodation.
>
> Public ownership of public utilities is advocated in a quotation from Roger W. Babson, the statistician, but it is customer ownership through purchase and not government ownership by vote that he favors. The modern tendency in big business is to distribute holdings to as great an extent as possible. The man who buys transportation will be much more amenable to reason if he has a dividend interest. It was said of old that the possession of a dollar made a capitalist and the ownership of a share of stock would convert a socialist. This is exaggeration, perhaps, but the point is evident enough.
>
> If a man has a share in an enterprise he can be fairer in his judgment concerning outlay. He will take the trouble to inform himself as to income and expense and will not insist upon impossibilities.

I had a bully time with him and he left the office sold on the thought that "publicity most assuredly does produce results."

It has long been a feeling among certain utility operators, and perhaps justly so, that the only time the name of their company could be brought before the public in the local press was when a serious accident had occurred or there is something to criticise and condemn. There is a certain news value to a great many features of public utility operation that the newspapers appreciate and are anxious to pass on to their readers, but which we in our everyday routine consider commonplace and uninteresting—yea, oftentimes a nuisance. This fact was quite forcibly brought to my mind several years ago, while in conversation with some newspaper men.

On this occasion I was a member of a party of newspaper men seated around the dinner table. I was then with a road at Schenectady. Conversation began to lag and while sparring for time I remarked that I had learned of a rather unusual trait in one of our motormen that day, one whom I never believed had a single thought for any one but himself.

I then told the story of a motorman who while operating an interurban car between two stations observed a woman struggling and battling her way across a field in the face of a raging blizzard. As the car approached, the woman dropped to the ground from sheer exhaustion. The motorman ran into the field, picked the woman up and brought her to the next town and into the hospital. The woman's life was no doubt saved by quick thinking on the part of the motorman.

The newspaper men exclaimed in a chorus, "Why didn't you tell me about that when I was talking with you yesterday? That's the great trouble with you fellows, the only way we can get any information out of you is to tell you we've got the story and you might just as well tell us all there is to it." That was in 1915, and since that time they have always had "all there was to it" from our office. Of course, it was given with certain reservations from publicity, but they received "all there was to it." The request for reservation has always been honored and the confidence reposed in giving "all there was to it" never violated.

Make your newspaper correspondent your confident. Tell him "all there is to it" and tell it yourself; don't delegate the office boy to do it for you. Personal contact with the head of the company instills a certain confidence and gives more weight to the story than passing it to the newspaper man through a subordinate.

I believe you will agree with me when I say that the majority of the American people are on the right side of any question after they have an opportunity to study the question and have been properly informed. Your best medium for placing the facts before your people rests in your local press. Use it. You don't necessarily need a high-priced news writer, with the cleverness to conceal advertising features in his story. The news writers are just as wise as your company news writer. They will publish your story if it has a news value, but if you want to put across advertising, you will have to deal with the advertising manager, not the editorial room. Perhaps that is why it seems impossible to get the local paper to publish anything except accidents, criticism or condemnation.

Our committee on public utility information feels satisfied in the light of the editorial quoted above, and because of the comment from other newspapers throughout the State of Kentucky, that all newspapers are willing to co-operate with public utilities in placing their problems before the public, if their story is furnished in a brief, frank and a concise manner, and again, minus propaganda.

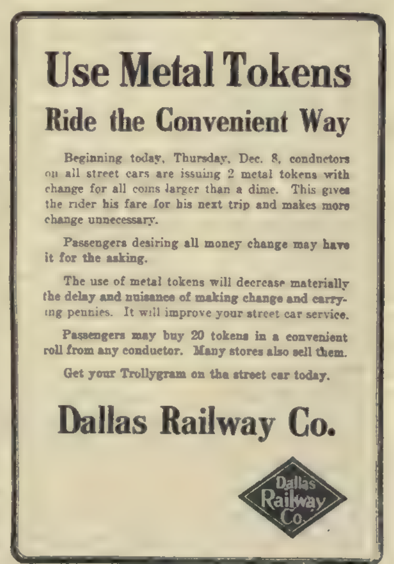
The *News Service Bulletin* now has a circulation of more than 900 copies. It is issued on the first and fifteenth of each month. Two hundred and fifty of these bulletins go to Kentucky newspapers, the balance of the circulation going to railway, telephone, light, heat and power companies and public officers, from the Governor and his staff down to the Aldermen and Councilmen of each community. Even the members of the State House of Representatives and the State Senate are on the mailing list.

Our committee firmly believes that considerable progress will be made in smoothing the misunderstandings at present existing between public utility operators and their respective communities if the thought is kept foremost in every utility operator's mind that utility problems have a real news value and that the editors are anxious and willing to receive the utility operator's story.

The old spirit of "the newspapers-be-damned" flickered out along with the spirit of "the public-be-damned" and the wise utility operator of today no longer slams the door in the face of the newspaper man and sends word out by the office boy that "he ain't in" but lays down the "welcome" doormat, extends the glad hand and proceeds to "tell him the whole story."

Encouraging the Sale of Metal Tokens in Dallas

TO ENCOURAGE the use of metal tokens in payment of fare on the lines of the Dallas (Tex.) Railway conductors on the lines of that company are now giving two metal tokens in change to every patron who tenders a coin larger than a dime in payment for fare on boarding a car, unless the patron makes special request for all change in return for his coin. Few patrons ask full change, but accept the two tokens, using one to pay the present fare and saving the other for a return trip or for use on some future occasion. The conductors on the various lines are given credit for the number of metal tokens they sell or the number registered by their fare boxes, and a campaign is on to see which conductor makes the best record in the use of metal tokens.



Use Metal Tokens

Ride the Convenient Way

Beginning today, Thursday, Dec. 8, conductors on all street cars are issuing 2 metal tokens with change for all coins larger than a dime. This gives the rider his fare for his next trip and makes more change unnecessary.

Passengers desiring all money change may have it for the asking.

The use of metal tokens will decrease materially the delay and nuisance of making change and carrying pennies. It will improve your street car service.

Passengers may buy 20 tokens in a convenient roll from any conductor. Many stores also sell them.

Get your Trollygram on the street car today.

Dallas Railway Co.

Dallas Railway Co.

FORM OF ADVERTISEMENT USED IN METAL TOKEN PUBLICITY

The use of these tokens by the riders of the street cars serves to speed up traffic, as the token, or piece, represents 6 cents, and can be handled with much more dispatch. If a patron tenders a large coin and waits for change the line of passengers boarding the car is held up and traffic delayed.

The Dallas Railway is employing its publicity forces to encourage the use of metal tokens.

"No Accident Week" Successful

A "NO ACCIDENT WEEK" conducted in Los Angeles, Cal., by the local chapter of the National Safety Council, Dec. 4 to 10, 1921, proved successful in reducing injuries and in educating the public to the need of safety first. "No Accident Week" produced 334 general street car accidents, an increase of fifty-one over the previous week, which was attributable to the steadily increasing traffic preceding Christmas. Despite the increase in total of general accidents, there was a marked reduction in the number of injury accidents. A total of 104 persons were injured to some extent in electric railway accidents between Nov. 27 and Dec. 3, but during the campaign there were only eighty-one listed. There were no serious accidents in "No Accident Week" and there were only three in the week prior to "No Accident Week."

CAR PLACARDED WITH "NO ACCIDENT WEEK" SIGN

Future of Electric Railways Well Assured, Milwaukee Railway Says

"FEAR NOT" is the advice from the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., in answer to a remark credited to a city official that "the street railways are a lot of junk" and by the prediction also credited to him that the motor bus will put the street car out of business.

To prove that the official's statement was not 100 per cent accurate and to calm the fears of the subscribers to the 8 per cent preferred stock of the company an interesting advertisement entitled "Street Car Service Is Indispensable" has been appearing in the Milwaukee papers. In championing the railway the "ad" says that next to the city water system the railway is the most vital of all public services to the life of the community. It carries more than 200,000,000 yearly and has a physical value of more than $23,000,000. Despite the fact that the company has not been permitted to earn a fair return it has earned enough money to meet all of its obligations and to pay a small dividend to its common shareholders, who have been required by state regulation to take much less than a fair return during the past year upon their investment.

In summing up the usefulness of the railway the company announces that, in view of its twenty-six year record of leadership, it will make use of all betterments that are developed. Further, that it will pay 8 per cent on every dollar invested, and it invites the public to buy some shares of the $1,200,000 remaining of the $3,000,000 stock offering.

Railway Helps Clean City

After Blizzard Baltimore Company Hauls Accumulations of Ashes in Dump Cars at the Request of the City Authorities

BALTIMORE, MD., was visited on Jan. 28 and 29, 1922, with the heaviest single snowfall in the records of the local weather bureau—26½ in. falling within a period of approximately thirty-five hours. Under such trying conditions, aggravated by stalled vehicles, especially automobiles, the street railway lines of the United Railways & Electric Company were badly blocked the night of the 28th, but due to strenuous efforts that night and extending through the twenty-four hours of Sunday, the 29th, practically all the important routes were operating when people started to work Monday morning.

For a week beginning Monday, Jan. 30, the efforts of the street cleaning department were devoted to clearing the important thoroughfares of piles of snow, and this resulted in an ever-increasing accumulation of ashes and garbage. Finally, this situation began seriously to clog the alleys and sidewalks in many parts of the city. In order to make a quick and effective start on the cleaning up problem, the city authorities asked the United Railways to help to move the ashes by operating service cars at night. Notices and advertisements were run in the daily papers announcing this service and asking householders to put their receptacles full of ashes at the curb along the car routes.

Through the co-operation of the transportation and maintenance of way departments, nine 15-yd. capacity differential dump trucks and six other open-top service cars were operated nightly for about ten days from 1 to 5 a.m., making two round trips and carrying approximately 150 cu.yd. per night to the dump. This co-operative effort has enabled the regular city forces to devote their efforts to localities other than those adjacent to the car lines and has been of material assistance to the street cleaning department.

Heavy Electric Traction Abroad[*]

In Papers Prepared for Ninth Congress of International Railway Association Engineers of Railroad Electrifications in Europe Summarize the Situation for Their Several Countries

THE forthcoming International Congress, to be held in Rome, Italy, in April, will be the occasion of a complete review of heavy electric traction. Competent authorities in all countries having considerable electrified track will present reports, most of which if not all will be made public by the International Railway Association in advance of the congress. Abstracts of some of the papers have already appeared in this journal.[†] Abstracts of other papers follow.

ELECTRIFICATION IN THE SCANDINAVIAN COUNTRIES

The chief of the electrical department of the Swedish State Railways, M. I. Öfverholm, will report for Sweden and Norway. He states that these countries and Denmark have not the necessary quantity of home produced coal, but that Sweden and Norway have ample water power. The desire has long existed in Sweden to make the railways independent of foreign coal, and a royal commission to study the question of electrification was appointed in 1899. After many preliminary studies and experiments the first proposal was for the use of electric motive power on the ore-carrying road connecting Kiruna, in the mining region of Sweden, with the Norwegian port of Narvik. This road runs for 81 miles through Sweden. The electrification from Kiruna to Riksgränsen was commenced in 1910 and finished in 1915, with power supply from a hydraulic plant at Porjus. It was extended in 1917.

In 1917 the Riksdag, the Swedish Parliament, decided upon the electrification of the Kiruna-Svarton line and authorized the expenditure for the Kiruna-Gällivare and Gällivare-Nattavaara lines. The work was carried out by the personnel of the State Railways, and electrical operation was begun on the Kiruna-Gällivare line in March, 1920, and on the Gällivare-Ripats line in February, 1921. The Riksdag in 1920 granted money for the Nattavarra-Svartön line, and the Norwegian Storting has decided upon the electrification of the Riksgränsen-Svartön line. Both of these will be in operation this year.

All of this electrification is on the single-phase system, with 16,000 volts on the contact wire, and with the transmission at 80,000 volts.

For electric traction there are now twenty-two locomotives on the Riksgränsen-Gallivare line, and twelve more due, as well as two motor cars. In 1922 eleven locomotives will be delivered. Thus by the end of this year there will be forty-five locomotives and two motor cars on this line, of which four locomotives will be for express trains, one for passenger trains, twenty-eight for ore trains and twelve for freight trains and switching.

Investigations looking toward further electrifications have been made, but an unexpected fall in the price of coal and the difficulty of raising money have caused a postponement of actual work.

What has been said relates to the State Railways. In addition there are several company-owned electrifications in operation. At present work on the Klarälv railways which connect Karlstad with Munkfors, Hagfors and Filipstad is already complete or nearly so.

In Norway the Thamshavn-Lökken railway, carrying copper in the Trondjem district, has been electrified since 1908. This line has 4 per cent grades. The Rjukanbanan was electrified in 1911-1912. The Norwegian State Railways are now electrifying the Kristiania-Drammen line, and as mentioned above the road connecting Narvik and Riksgränsen will be completed at once. By the end of 1922 the whole railway from Narvik across the Scandinavian peninsula down to Lulea and Svarton will be in electric operation. Single phase is standard in Norway, 6,000 volts being used on the contact wire on the Thamshavn line and 10,000 on the Rjukan line. The line connecting with the Swedish one will have the same voltage as the latter—16,000.

A heavy suburban business is expected on the Kristiania-Drammenbanan, as well as freight and express. Twenty-four locomotives of the B + B type and 1 — B + B — 1 type have been ordered. The Norwegian State is buying up water powers and conducting studies looking toward systematic electrification of the railways.

ITALY HAS BEEN SUCCESSFUL WITH THREE-PHASE

According to Alfredo Donati, chief of the special electrification service of the Italian State Railway System, who will report for his country, the first trials of electric traction were made in Italy from 1899 to 1901. In 1901, in fact, electrical working of the Milan-Varese line, 37.3 miles, was inaugurated, with direct current, third-rail distribution. In the same year the Valtellina lines (Lecco-Colico-Sondrio and Colico-Chiavenna), 66 miles long, were electrified with low-frequency, three-phase current.

For the Valtellina lines 15 cycles were selected in the interest of transmission efficiency and mechanical simplicity in the locomotive drive, although not without some difference of opinion. A voltage of 3,000 on the contact wires was selected, then considered high.

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[*] See Bulletin of the International Railway Association as follows: Report on electric traction, Sweden, Norway, Denmark, by M. I. Ofverholm, November, 1921, page 1934; Italy, by Alfredo Donati, December, 1921, page 2175; France, by M. Sabouret, January, 1922, page 107.

[†] See as follows: Report on America by George Gibbs, issue for Jan. 28, 1922, page 147.

Report on Holland and Great Britain by J. J. W. Van Loenen Martinet, issue for Dec. 3, 1921, page 988.

Report on Switzerland by Dr. E. Huber, issue for Dec. 3, 1921, page 988.

For the nine years following the successful inauguration of the above-mentioned service no considerable increase in electrification was made but the results were watched with interest and the effect was the adoption of the three phase as standard. Since 1910 much has been accomplished on lines carrying heavy traffic. Between 1910 and 1914 the two Giovi lines were electrified. These connect the port of Genoa with the interior across the Apennines and hold the record for traffic on the Italian railway system. They contain grades up to 3.5 per cent. In the same period were electrified also the Savona-Ceva line, crossing the same range; and the Mont Cenis line with its tunnel, the most important line of communication with France. During the past four years on these lines the traffic has been four times as dense as the mean for the Italian railway system.

During the few years past much activity has been manifest also on the lines near Turin. Thus by the end of 1919 it was possible to commence electrical working of the Turin-Bussoleno line and of the Bussoleno-Susa section (33 miles, of which 28 is double-track). This provides connection with the already electrified Fréjus line (Bussoleno to Modane) and the Turin-Pinerolo line, in anticipation of connecting the whole of the electrified system of Piedmont with that of Liguria, and with the electrical installation of the Turin-Ronco line, which is due to be completed at about the present date. In 1922 the electrification of the Voghera-Alessandria, Tortona-Novi and Tortona-Arquata lines will be complete, giving access from the Giovi lines to the Milan-Chiasso line and thence to Switzerland.

The above has applied to the State Railways, but there are in Italy also company-owned lines operated electrically, amounting to mileages of 125 of standard gage and 310 of narrow gage. It should be said also that simultaneously with the development of the railways has been carried out a comprehensive system of power generation and distribution, of which the details cannot be given here.

The new program for the extension of electric traction which has been drawn up by the Railway Administration and the government anticipates the electrification of about 2,800 miles of railway. This is expected to effect a coal saving of 1,250,000 tons annually and to involve a consumption of electrical energy of 600,000,000 kw.-hr. A generator capacity of 180,000 kw. will be required. Already in hand are the following lines: Genoa-Pisa, Bologna - Pistoia - Florence, Bologna-Faenza-Florence, Pinerolo-Torre-Pellice, Bricherasio-Barge, Rome-Tivoli and Rome-Carano-Nettuno. The two lines last mentioned will form the nucleus of future electrification on the Italian peninsula.

In his report Mr. Donati states that the complication of the appearance of the overhead contact wires with the three phase is more apparent than real. The insulation between wire and wire, and between each wire and the rails in the type of suspension adopted by the State Railways is tested to 30,000 volts. There has never been any difficulty in maintaining the insulation, even on the Savona-Genoa line on the coast, where there was much difficulty in maintaining the insulation of the transmission line due to the salt carried by the wind. The main difficulty with the insulators is a mechanical one, due to the vibration caused by the passage of the contact device at high speed. The cross suspension of the contact line has been found preferable to longitudinal suspension.

TABLE OF COMPARATIVE DATA FOR STEAM AND ELECTRICAL OPERATION ON ITALIAN STATE RAILWAYS

Figures given in lire per 1,000 virtual ton-kilometers

	Steam Traction	Electric Traction	Electric Traction on Lines of Ligurian Group and Fréjus Line
Coal supplied to the locomotives (at 248.46 lire per ton)	13.15	....	....
Electric energy for traction	.....	1.60	1.51
Locomotive staff, lubrication and various shed expenses, water supply, etc.	1.61	1.12	1.04
Maintenance of locomotives	1.22	0.80	0.62
Amortisation and interest on cost of locomotives	0.64	0.77	0.62
Maintenance of electric installation	.....	1.00	0.78
Amortisation and interest on cost of electric installation	.....	1.42	1.13
General expenditure on staff, provident fund, bonuses, etc	0.42	0.45	0.37
Totals	17.04	7.17	6.07

The great simplicity of the three-phase induction motor, together with its great power, enables the three-phase locomotive to be made simpler and lighter than those of other types.

The Italian electric locomotives are not permitted to have a weight greater than 15 tons per axle, which is the limit of load on most of the bridges. The normal tractive effort may not exceed 10 tons on account of the draft gear of the cars. It has been found possible to build locomotives to fit these conditions capable of developing 2,000 kw. at 46.5 m.p.h. and with a total weight of 75 tons.

WHAT ELECTRIFICATION HAS ACCOMPLISHED IN ITALY

The principal end which it was proposed to attain in the first electrifications from the technical standpoint was the economical increase in the capacity of the lines. This has been completely attained. For example, the traffic which on the two Giovi lines before electrification was about 306,000,000 ton-miles per annum, had within a few years thereafter increased to 734,000,000 ton-miles. The corresponding figures on the Bussoleno-Modane line were 67,000,000 and 245,000,000 ton-miles, with a maximum in 1918 of 314,000,000 ton-miles. The traffic increased three to one on the Savona-Ceva line.

The constant-speed characteristics of the three-phase locomotive are credited with much of the possibility of carrying such heavy traffic. On account of the limitations of weight per axle and tractive effort per locomotive, it has been necessary to use two or even three locomotives per train, the former being the more common. With two locomotives, one is placed at each end of the train.

A comparison of the costs chargeable to electric traction and to steam traction is given in the accompanying table for the financial year 1917-1918, for which the complete accounts are available. To make the results comparable among themselves they have been reduced to the basis of 1,000 virtual ton-kilometers hauled. As they are for comparison among themselves they have been reproduced here in their original form.

The automatic substation is finding a place in the electrification work of the Italian State Railways. All stations having synchronous motors are designed to work automatically, with a view to reducing the expense of the staff. Some of the transformer substations have recently been changed to automatic substations, as for example that at Varazza on the Genoa-Savona line.

On the Rome-Tivoli and Rome-Carano-Nettuno electrifications the frequency of the local power supply, 45 cycles, has been adopted in place of the 15 to 17 cycles used elsewhere. On the Benevento-Foggia line the high-voltage direct-current system will be tried, but difficulty is expected on account of the weight of the locomotives.

As far as system is concerned, however, Mr. Donati expresses his belief in the technical acceptability of all, the matter of system, he thinks, having been given too much emphasis. Any other detail of the working may have a greater economic importance. The provision of a single electrical system over the entire railway system is of greater economic importance than the question of the actual system selected.

In fact, he states in concluding the report, this unified system leads to the much more complete utilization of the electrical energy, of the plant and of the staff than when adjacent sections are worked by different systems.

LARGE ELECTRIFICATION IMMEDIATELY AHEAD IN FRANCE

At the Congress the situation in France will be reported upon by M. Sabouret, chief engineer of the technical department of the Orleans Railway. He opens his statement by saying that in 1920 the French government made regulations regarding the application of electric traction to railways of "general interest." Three companies, the Paris-Lyons-Mediterranean, the Midi, and the Paris-Orleans have proposed to electrify within approximately twenty years a total length of line of 5,000 miles. These companies have for a long time used electric traction on isolated sections of line, including an important network of lines in an undulating country, or arteries having considerable traffic in mountainous regions, these regions being rich in water power.

After full investigation the Minister of Public Works has decided that the electrification of railways of general interest in France shall be subject to the following general regulations:

1. The primary distribution shall be by three-phase current, 50 cycles, according to the condition laid down for the great distribution companies, so that all the regional groups may have interchangeable electrical energy and may help each other mutually;

2. The traction current shall be continuous: its pressure is fixed normally at 1,500 volts (exceptionally at 3,000);

3. Every locomotive at 1,500 volts will be fitted with two current collectors, one being a third-rail collector, and the other for the overhead line; and must be able to run and collect current on any line electrified at the same voltage.

Heavy Traction Inaugurated in France in 1900

Impressed by the success of the Baltimore & Ohio tunnel electrification in Baltimore, the Orleans Company intrusted to the General Electric Company, the builders of the locomotives for that installation, the electrification of the Quai d'Orsay station in Paris. Electric service was inaugurated in June, 1900. Locomotives weighing 50 tons and of 1,000-hp. capacity were employed. The satisfactory working of this first large underground electric station induced the directors of the Pennsylvania Railroad, in the following year, to abandon the project of an aerial crossing of the Hudson River in favor of a tunnel and a large underground station in the heart of New York.

Between this time and 1910, the Orleans Company, the Ouest Company, the Paris-Lyons-Mediterranean Company, the Midi Company and the State Railways carried out a number of electrification projects also.

The second period of French electrification was divided into three parts by the war. Up to the war period the several companies continued their electrification development. Most of this was in the line of experiment, but much progress was made by the Midi in the Pyrenees, the State Railways and the Orleans Company in suburban electrification, etc.

The war turned attention from this work to that of developing sources of power, but the possibilities of using vast supplies of water power intensified the interest in electrification of railways, after the signing of the armistice permitted this. The large railway companies outlined programs calling for the total mileage mentioned earlier.

Immediately after the armistice the Minister of Public Works appointed a committee to consider and report on the whole matter. This committee, in turn, appointed two commissions, one technical the other administrative, to secure data and formulate recommendations. One of these visited the United States and other countries in 1919, and the main committee was able to report in May, 1920. As a result the regulations mentioned earlier were promulgated. The reasons for these regulations are given in full in the committee's report, and are abstracted by M. Sabouret. They have been summarized in earlier issues of the Electric Railway Journal.

French Electrification and the Distribution of Energy

M. Sabouret points out in his report that the use by the three companies mentioned earlier of a primary three-phase, 50-cycle distribution, offers so many advantages that they would adopt it even if the traction current were alternating and of 16 or 25 cycles frequency. Their hydro-electric stations will be far separated and surrounded by other stations. By merging their distribution in the general distribution the companies will contribute to the country-wide diffusion of energy. They will find a better investment and favorable conditions for supplementary purchases or exchanges of current.

The Midi Company has already four stations in the Pyrenees, and will eventually have 250,000 kw. available. It will partially equalize the load on the plants by means of water storage. It will probably construct stations in the Cevennes to feed the northern part of its system, and will perhaps participate with the other two companies in the development of the Truyère works as explained below.

The Paris-Lyons-Mediterranean will find its principal sources of energy on the upper and middle Rhone. The intention is to harness several high falls in the Alps and the Cevennes which can give a regular supply, and also possibly participate in the Truyère work.

In 1920 the Orleans Company obtained concessions for seven hydro-electric power stations in the Haute-Dordogne and its tributaries, in the center of its system, 250 miles from Paris and 170 miles from Toulouse. Their capacity will exceed 150,000 kw. The company has also taken an important part in the concession of dams on the Creuse, 205 miles from Paris, which will be able normally to produce 150,000 kw. unequally distributed over the year. Their working will be linked up with a steam station in course of construction at Cennevilliers, near Paris. Finally, the company will find, to the south of the Massif Central, other hydro-electric works, in construction or projected, in which it will be able to participate, in particular those of the Truyère.

The Truyère, the principal tributary of the Lot, receives the waters of a watershed of 927 sq.miles in the southeast angle formed by the Cevennes and the Monts d'Auvergne. The average power obtainable exceeds 200,000 hp., the supply being almost regular. The flow of the watercourses of the Central Plateau is complementary to those of the Alps and the Pyrenees; the Truyère will feed the Rhone and Garonne basins during the winter, and the central region during the summer.

This large program of the organization of hydro-electric energy shows clearly the obligation of the three companies to associate themselves in a work of unification required in the national interest and to promote the linking up of the three great producing districts.

In the case of the Orleans Company, for example, its participation in the combination scheme will have the effect of enabling the water power of Central France to be transmitted first into the middle Loire district and then to Paris and the neighborhood. It will also give the whole group of water power stations, in dry years, the valuable assistance of a large steam-power station.

M. Sabouret explains that most of the electrification in France was effected under conditions which render impossible the estimation of the economic result. On the line between St. Georges De Commiers and La Mure there was shown a saving in working costs of 30 per cent.

In reality it is by other than economic considerations that the companies will be guided in their choice of the first lines to be electrified. They will begin with those where increase in capacity is most urgently needed. These will supply data which will serve as a guide in the extension of the process to lines whose electrification is not demanded by any exigencies of working.

Correction in Data on Welding Flanges

IN THE issue of Feb. 4 of this paper, page 196, appeared an abstract of the paper presented by E. B. Gunn at the Central Electric Railway Association, Indianapolis, Ind., entitled "Three Years Experience in Welding Worn Flanges." A typographical error in the table analyzing the expense of welding wheels has since been found. The table should read:

150 lb. welding metal at 8 cents per pound	$12.00
30 hours welding operator labor at 60 cents	18.00
150 kw.-hr. at 2½ cents	3.75
10 hours machinist labor at 60 cents	6.00
	$39.75

The error which was made was that the figure "1" in the first line was dropped to the second line, thus materially distorting the impression as to the amount of welding metal and the amount of labor.

A.I.E.E. Holds Midwinter Convention

THE tenth midwinter convention of the American Institute of Electrical Engineers was held in the Engineering Societies Building, New York, N. Y., Feb. 15-17. Papers and discussions given on lightning arrester practice, on the dielectric strength of oils, the flashing of rotary converters and the heating of railway motors were of interest to the electric railway engineers. An abstract of the paper on factors which determine railway motor temperatures by G. E. Luke, Westinghouse Electric & Manufacturing Company, was given in last week's issue of the ELECTRIC RAILWAY JOURNAL.

In the discussion of this paper C. J. Fechheimer illustrated the similarity between the time temperature curve equations and the equations of the building up of current in circuits containing an inductance or capacitance. F. W. Peters said that the percentage of failures due purely to overheating was small. Many failures that seemed to be due to overload often were caused by defects in the motors themselves, such as the breaking down of insulation due to a loose coil or to the accumulation of moisture.

In a paper on the causes of flashing of synchronous converters E. B. Shand, Westinghouse Electric & Manufacturing Company, said that heavy load surges in synchronous converters produce unbalanced armature reactions and abnormal voltage conditions on the commutator, thus constituting one of the chief causes of flashing, according to extensive studies made by the author. To increase the momentary overload capacity the following main lines of progress were suggested:

1. The improvement of synchronous characteristics of the converter installation to obtain high stability and the reduction of the moment of inertia of the rotating masses of the converter.
2. The reduction of the effectiveness of the unbalanced reactions in producing high voltages in the commutating zone. (High-reluctance commutating poles are an instance of this.)
3. The prevention of the complete propagation or culmination of the arc by the insulation of conducting parts around the commutator by means of flash-guards and other devices.
4. The limitation, by external means, of the maximum severity of the surges thrown on the machine (in which might be included the high-speed circuit breaker.)

These principles have been utilized in devising suitable means of improving the characteristics of commercial types of 60-cycle railway synchronous converters, with the result that they have proved themselves much superior to their predecessors.

A paper in defense of standard practice in lightning arresters was given by E. E. F. Creighton of the General Electric Company. He said that in a recent investigation conducted by the protective devices committee criticisms were received of current lightning arrester practice as applied to transmission lines. For the most part practice in lightning arresters is standardized. In fundamental principles there have been no changes for many years, though improvements in details, especially of construction, are still being made. In answer to criticisms made by a few prominent engineers, it is maintained as fundamental that a high discharge rate for an arrester is an absolute essential. The burden of proof falls on those engineers who use arresters of low discharge rate. These arresters cannot discharge the dangerous lightning surges on overhead lines since the current in a traveling wave is about 2 amp. for every thousand volts of lightning potential. Since there are lightning arresters of low discharge rate in apparently satisfactory use, an explanation for this anomaly is found in the use of insulators of low arc-over voltage. Either the lightning potential is relieved locally at the insulator or the resultant traveling wave is of too low voltage when it reaches the transformer greatly to endanger the insulation. However, such poor line insulation is not a solution of the problem of continuity of service. Why not save the cost of the useless lighting arrester?

How many arresters should be used to protect a six-feeder system? It depends on the conditions of insulation in circuit breakers and the importance of continuity of service. According to the conditions discussed in the paper, from one arrester to seven arresters with auxiliaries are needed.

The use of no arresters was discussed in this paper from three standpoints—(1) if it is contended that lightning is not of sufficient voltage to cause damage; (2) if it is considered a better investment to put lightning-arrester money into spare transformers; (3) if it is considered good practice to insulate a transformer so highly as to give it immunity from lightning. The conclusion reached was that each of these suppositions is faulty and dangerous.

A new method of inspection of aluminum arresters was proposed, based on the fact that the power factor of the cells varies considerably according to their condition. There are promises of effecting economies in overhauling aluminum arresters and of lengthening their life. Experiences with a 33-kv. arrester in service thirteen years without overhauling were given. The plates are still in good condition. The usual damaging deposits of decomposed oil on the aluminum film were prevented by using an initial rush of charging current great enough to throw them off. The electrolyte is partly exhausted in strength and needs changing. However, the discharge rate is still high.

In the discussion a new valve type of arrester was described by Dr. Joseph Slepian.

Union Internationale Will Change Name

THE Union Internationale de Tramways et de Chemins de fer d'Intérêt Local has called a meeting to be held in Brussels on Feb. 18 to adopt a new constitution and by-laws, according to the plan already announced, the purpose being to reorganize so as to confine the members of the association to the Entente and allied nations and neutral countries. At the same time the plan is to include the words "transports publics automobiles" in the name of the association so that its complete name, when rendered in English, will be the International Street and Interurban Railway and Bus Association.

Other changes in the constitution on which a vote was to be taken on Feb. 18, in addition to excluding companies in the Central Powers, are as follows:

The executive committee is to consist of not less than ten nor more than twenty members (instead of not less than seven nor more than fifteen) and three vice-presidents instead of two.

The official language of the association will be French instead of both French and German, and the proceedings will be printed only in French. There is a slight change made in the annual dues, which are based on the gross receipts and are payable in Belgian francs. The dues for individual members proposed are 40 francs instead of 20 francs a year.

Accident Prevention on Electric Railways

THE following bibliography in regard to accident prevention on electric railways has recently been compiled by Miss Mary B. Day, librarian National Safety Council of Chicago:

INDEXES

Industrial Arts Index, published by the H. W. Wilson Company, New York. See references to magazine articles under the subjects "Electric Railroads—Accidents" and "Street Railroads—Accidents." These indexes index such publications as ELECTRIC RAILWAY JOURNAL, *Electrical Review*, etc.

National Safety Council, Proceedings, 1912 date. See references under subjects, "Electric Railway Section" and "Electric Railways." Each year an analytical index by subject and author is got out for the Proceedings. In 1918 a cumulative index covering the seven preceding years was compiled. This cumulative index appeared in the 1918 Proceedings.

National Safety Council News. Six months' index appears in January and July issues. See references under "Electric Railways" and "Street Railways."

BULLETINS

National Safety Council, Electric Railway Bulletins suitable for posting on company bulletin boards. Some two hundred have been issued up to date. They come out each month and are included in National Safety Council service.

COMPANY BULLETINS

Brooklyn Rapid Transit, Instruction Branch, Surface Transportation Department, Bulletin board bulletins.

East St. Louis and Suburban Railway. Bulletin board bulletins.

Columbus Railway Power & Light Company, Safety school bulletins. Bulletin board bulletins.

Puget Sound Traction, Light & Power Company, Bulletin board bulletins.

MISCELLANEOUS PUBLICATIONS

American Electric Railway Association. Accidents and safety work. An outline of the safety organization and activities of a large number of companies, together with statistics showing the number, kind and cost of accidents, 1921. (Typewritten.)

American Electric Railway Association, Legal requirements covering the carrying of jacks on cars, 1920. (Typewritten.)

Andrews, H. L., Safety Cars, 1919. (Presented at eleventh annual convention of the Wisconsin Electrical Association.) (Pamphlet.)

Brooklyn Rapid Transit Company, Joint Efficiency Campaign leaflets:

Air brake efficiency, 1917. Baseball and safety, 1917. Blind accidents, look out for them, 1917. Eyes, 1917. Fire lessons, 1917. Fire losses, 1917. Good housekeeping, 1917. Motors and brakes, 1917. Our motormen and your drivers, 1916. Questions, 1917. Save power, 1917. When accidents happen, 1917.

Brooklyn Rapid Transit Company, Bulletins, numbers 1-5. Pamphlets 1914:

Safety organization system, 1914. Brooklyn's safety crusade, 1914. If you must hurry, 1916.

Beaver Valley Traction Company, Father, mother, teacher. (Pamphlet.)

Beaver Valley Traction Company, Employees' service code, n.d. (Pamphlet.)

Cordell, Henry, Safety rules for men in the mechanical department. (In Safety bulletin of the Bureau of Safety, December, 1920, pages 14-15.

DeBlois, L. A., Safety in the one-man car, 1921. (Typewritten sheets.)

East St. Louis and Suburban Company, Safety first bulletin, 1915. (Pamphlet.)

Handlon, J. H., How to avoid accidents, 1911. (Pamphlet.)

Handlon, J. H., For humanity's sake, 1918. (Pamphlet.) Issued by United Railroads of San Francisco, Cal.

Hill, O. R., Observations on braking. In Safety Bulletin of the Bureau of Safety, March, 1920, pages 13-14.

Johnson, F. W., The prevention of accidents, 1910. McGraw-Hill Book Company, New York. (Pamphlet.)

Milwaukee Electric Railway & Light Company, Primer of precaution published in the interests of "Safety First." 1916. (Pamphlet.)

Milwaukee Electric Railway & Light Company, Some aspects of one-man safety car operation, with special reference to the Milwaukee situation, 1921. (Typewritten.)

Memphis Street Railway Company, Smooth operation leads to safety, 1916. (Pamphlet.)

McDougall, R. E., Electric Railway hazards. In Safety bulletin of the Bureau of Safety. November, 1920, pages 14-15.

Quebec Railway, Light & Power Company, Prevention of accidents, 1916. (Pamphlet.)

Quebec Railway, Light & Power Company, Slipping rails, 1916. Accident reports, 1917.

San Francisco-Oakland Terminal Railways, How to get a good coasting record, 1917. (No. 20.) (Pamphlet.)

Union Pacific System, Common standard specifications number 1,022. Electric light, power supply and trolley lines crossing railroad tracks and rights of way, 1920.

United States Bureau of Standards, Data on electric railway track leakage, 1916. (Technologic paper No. 75.) (Pamphlet.)

United States Bureau of Standards, National electrical safety code, 1921. (Third edition No. 3.) (Pamphlet.)

Winnipeg Electric Railway, Circulars:

Car service efficiency, 1916. (Circular No. 13.) Economy and prevention, 1914. (Circular No. 5.) Gongs, 1915. (Circular No. 8.) Old timers' association—Safety First, 1914. (Circular No. 3.) Safety first, slipping rails and railway crossings, 1917. (Circular No. 15.)

TRADE CIRCULARS ISSUED BY MANUFACTURERS

The National Safety Council Library has on file an up-to-date file of trade circulars of manufacturers who sell or manufacture various safety devices in use by electric railways. Lists will be furnished upon request.

American Association News

Committee on Safety Work

THE first meeting of the committee on safety work of the Transportation & Traffic Association was held in Pittsburgh on Jan. 25. Those present were E. D. Reed, D. E. Parsons, Claude L. Van Auken, G. T. Seely and W. H. Boyce. The discussion was active and many helpful ideas were brought out.

It was decided that the task of this committee would be to secure the active co-operation of all utility managers and department heads by, in the somewhat overworked words of the day, "selling the idea of safety to them." To do this it was decided that the form of the report should not be along lines similar to the reports of other committees. Instead, the committee decided that its report should have a cartoon cover and be illustrated with cartoons or photographs, that the appeal or sales talk of the committee be made the body of the report, and that the appendixes contain a partial bibliography, statistics as to what had been accomplished on other properties, outlines of various methods of putting safety campaigns into effect, etc. It was also deemed advisable that the committee get in touch with the heads of the four other associations and request that the committee be permitted to furnish a three to five minute talk on safety at each meeting held by these other associations, and also attempt to secure the right from these other associations to run safety slogans on each page of each pamphlet that it puts out. The argument for this privilege would be, not that the safety committee work is any more important than that of any other committee, but entirely from a humanitarian standpoint—the conserving of life and limb.

The committee decided to attempt to have the advertising section of the American Electric Railway Association send out a pictorial broadside containing a small amount of wording, to depict in this way to the various managements some of the methods found successful to other companies. It was suggested that on the broadside a card be attached, addressed to the person who opens the mail, calling attention to the fact that he may be the means of causing a life or lives to be lost if he does not send this pamphlet on to the person addressed or to the highest officer of the company.

It was decided that the committee, with the approval of the proper officers of the association, should hold a safety exhibit of newspaper, car card, bulletin board, dash board, and pamphlet advertising at the midyear meeting and that it should attempt to get the National Safety Council to furnish a part of this exhibit properly mounted. A similar but larger exhibit will be made at the annual meeting, if the plans of the committee are followed out. The committee will also ask the presidents of other companies that have continuously conducted safety work for several years past to give a brief outline of their experience with safety—an expression in just a few words as to the concrete results that continuous safety work had accomplished for those properties in the prevention of accidents, increasing morale and efficiency, and the saving of dollars and cents on their property; then show other operators throughout the country, through magazine articles, what the managements of properties that have been engaged in continuous safety work think of such work.

The committee will ask the editors of the technical papers to publish a different one of these articles each month between now and convention time. The chairman of the committee agreed to secure the data necessary for the publishing of an article concerning the different safety methods and plans used on various properties throughout the country.

The committee realizes that one really serious question that confronts it is how to get companies who had tried haphazard, unorganized safety methods from which they, of course, did not receive the proper results, to make another effort but try properly planned, organized and continuous safety work. The committee was of the opinion that although the campaign methods of safety work are better than nothing, the only true value that can be received from safety work is the sort of safety work that is done continuously. The committee believes that every railway company should be doing safety work continuously on a well defined program. The point was also brought out that while the money spent on accidents and taxes is not productive to the benefit of a street railway company, there might be some argument in favor of the taxes, but absolutely none in favor of accident cost.

Mr. Parsons of the safety committee is to prepare, probably as an appendix, a set of questions and answers for "unconverted" managers, such as this one, which would probably be the first to be asked: "If all the men in the operating department obeyed all the rules in the book, would there be any need for safety work?"

Decisions in connection with the association were as follows: Secure a three-minute speaker for each meeting at the convention, provided this privilege is accorded; see if *Aera* will give a cover, before the convention, devoted to safety; publish in *Aera*, in the name of the safety committee, an open letter to railway managers, asking each what he is doing for safety.

One problem of the committee is to show how collisions with autos can be decreased by continuous safety work. It intends to prove that accident prevention does not cost a great deal of money compared to the claim department cost and for the benefit derived.

The committee believes in, approves of, recommends and will support the National Safety Council, yet out of more than 900 railways but 110 were supporting this council last year.

It was decided that at the next meeting of the safety committee, which will be held at the Hotel Claypool, Indianapolis, Feb. 27, 1922, or prior to that time, some members of the committee should meet with some members of the National Safety Council to secure their ideas on selling the idea of safety.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Purchase Outlook Improved

Better Spirit Appears to Prevail at Detroit Since Purchase Negotiations Have Been Resumed

Negotiations between the Detroit (Mich.) United Railway and the Street Railway Commission of the city of Detroit arranged for following the recent meeting of stockholders of the company have apparently brought the two parties near a settlement although a price satisfactory to both parties has not been reached.

CITY OFFERS $19,500,000 FOR LINES

It was announced following the meeting on Feb. 17 that the city had offered the company $19,500,000 for its entire city system. This corresponds closely with the offer made by Mayor Couzens, of $16,500,000 plus the difference between the assessed value of the company's real-estate in 1919 and the actual value of the real estate at the present time.

In attempting to compare the city's first offer with the counter proposal made by the representatives of the Detroit United Railway, difficulty was experienced due to the fact that two different bases were used in the two offers. Negotiations were adjourned to permit the division of the property into classes such as tracks, real estate etc. and place a price on each classification. The city's offer of $19,500,000 quickly followed.

The company's representatives met the city's offer with a counter proposal naming $20,000,000 as a price on the company's city system exclusive of its real estate and carhouse in Highland Park. This property, the city claims, is necessary for the completion of the city-owned system.

The stockholders were represented by A. Avila Gingras, who made a plea to the commission to revise its offer to bring the figure named to agree more closely with the company's figures. The company's offer to sell at $20,000,000 if the carhouse and shops in Highland Park were not included, the city refused to consider as it regards these as essential to the operation of the municipal railway under the present plan of expansion.

MAYOR NOT AT CONFERENCES

Mayor Couzens was not present at the conferences held late in the week. The city was represented by G. O. Ellis and H. H. Esselstyn, members of the Street Railway Commission; Clarence E. Wilcox, corporation counsel; Joseph S. Goodwin, general manager of the municipal system, and Ross Schram, assistant general manager.

The company was represented by A. Avila Gingras and J. C. Butterworth, directors; J. C. Hutchins, chairman of the board; E. J. Burdick, the general manager, and Elliott G. Stevenson, counsel.

The company's proposal to revise its offer to permit the city to purchase that part of the property in Highland Park east of the Second Avenue so as to give the city the carhouse but permit the company to retain the shops and acreage is being considered by the commission in an attempt to reconcile it with the $19,500,000 price. The commission's recommendatons are to be reported to the Mayor and when an agreement is reached between the Mayor and the commission in regard to the revision of the offer further negotiation will be carried on with the company's officials.

The mandamus action to require the city to enforce the provisions of the ouster ordinance to compel the Detroit United Railway, to remove its tracks from Fort Street and Woodward Avenue has been dismissed by Judge Marschner because of the failure of the plaintiff to obtain service on the Mayor, members of the Council and other city officials named. Attorneys for the plaintiff announced that a new action is to be filed naming all the city officials connected with the administration of city ordinances.

Illinois Central Getting Ready for Electrification

Announcement has been made that President C. H. Markham of the Illinois Central Railroad, will present a proposition to the stockholders on April 19, involving authorization of an issue of $50,000,000 preferred stock to be sold at various times as needed in the work of electrifying the lines in Chicago and constructing new freight and passenger facilities. As has been discussed in these columns before, the Illinois Central entered into a contract ordinance passed by city of Chicago, on July 21, 1919, whereby it agreed to begin electrification of the lines within the city within five years and to complete this work within five years more.

Since the contract ordinance was entered into, the company has been doing a great deal of work leading up to the decision as to the system of electrification which will be used and bearing on the many correlated problems involved in the very extensive improvement of the whole lake shore area occupied by the railroad. No decision has been reached as yet as to the system of electrification, but it is expected that an announcement will be forthcoming in the near future. The financial plan, as proposed, will be such as to enable the directors to take advantage of market conditions in disposing of the preferred stock.

Service-at-Cost Amendment Explained

Full explanation of the provisions of the bill introduced jointly in the Legislature of New York has been made by Senator Homer E. A. Dick and Assemblyman Simon L. Adler, Rochester, which bears on the service-at-cost street railway contract of that city.

The measure in question is still in committee, but is expected to be favorably reported soon. The bill amends the public-service-commission and transit-commission laws by adding three subdivisions thereto, being added to section 49 and chapter 48 of the consolidated laws.

Subdivision 9 defines a service-at-cost contract. Subdivision 10 authorizes municipal corporations and street surface railroad corporations to enter into such contracts. Subdivision 11 provides for the approval of such contracts by the Public Service Commission. The proposed bill applies only to municipal corporations having a population of less than 1,000,000.

In explaining the provisions of the new measure the sponsors of it said:

> In general, it may be said that the public, the railroad company, the municipal corporation and the Public Service Commission are all benefited by this bill. Where in any community the citizens as represented by the municipal corporation may enter into an agreement with the railroad company, and where the railroad corporation so desires, there seems to be no valid reasons for not permitting such harmonious co-operation. The Public Service Commission is relieved thereby from the possibility of continual rate cases with respect to any surface railroad corporation entering into such an agreement for the life of the contract. A considerable sum is saved to the street railroad company and to the municipal corporation by doing away with litigation and the tremendous expense of experts.
>
> It is to be specifically noted that a safeguard is continued by providing that before the contract shall be effective it shall be approved by the Public Service Commission

Pacific Electric States Its Case

To explain its position in the present controversy over rate increases granted by the California State Railroad Commission, the Pacific Electric Railway, Los Angeles, has issued a ten-page pamphlet, called "Should the Users of a Public Utility Pay the Cost of Service?" The history of the rate case is reviewed, the valuation statistics discussed, and the final rate adjustments restated. All of the topics have been discussed in the reports of the commission and may be found in preceeding issues of the ELECTRIC RAILWAY JOURNAL. After reminding the reader that stockholders have never received a dividend, the pamphlet concludes:

> Finally, this company desires to serve well the public convenience. It asks only a fair return on its property. It wants all rates established on a just and reasonable basis. It asks your co-operation in solving the present problem.

Montreal Contract Is Exacting

Explanation of Service-at-Cost Agreement Made by President of Commission

The service-at-cost contract between the Montreal (Que.) Tramways and the city of Montreal, recently the subject of an address by J. F. Saint-Cyr, president of the Montreal Tramways Commission, divides the authority among the representatives of the city, the company and the commission. This last body was appointed the latter part of April, 1918, following the acceptance of the contract by city and company on Jan. 9, 1918. The revenue is to be dispensed in the following order: operating expenses and taxes, maintenance and revenues, return on capital invested, city rentals, and contingent reserve fund.

City rentals are an additional requirement to the city taxes. In the United States a commission of inquiry in 1919 held one of the essentials of a service-at-cost contract to be that the companies be free from taxes and imposts. The Montreal contract, however, held that the company should pay what corresponds to the rental formerly paid to the city. It further stated that this should be collected, not from the general taxpayer, but from the traveling public. Mr. Saint-Cyr explained that the nature of this tax must thus be "construed as an indirect tax levied on passengers on the city's account."

The surplus is divided so that 20 per cent goes to the company, 30 per cent to the city, and 50 per cent to the fares reduction fund.

Operation under the contract for the period from February, 1918, to June 30, 1919, resulted in a deficit of $1,364,111. Mr. Saint-Cyr explained that this was due to a lowered fare rate enacted in October, more than three months after the beginning of the fiscal year. The reduced fare was the result of an appeal by the city to the rate set by the Public Utilities Commission. When the commission again raised the fares, the means provided in the contract for overcoming a deficit, the city again forced a reduction.

That year's deficit amounted to $364,700. Though there was no appeal the third year, the company had to do certain street repairing at the request of the city, resulting in a deficit for 1920-21 of $239,022. Thus the 1921-22 period was started with an accumulated burden of $1,967,934.

Mr. Saint-Cyr accompanied his address with a tabled analysis of the company's finances. Snow removal, a cost borne by no other company, according to Mr. Saint-Cyr, cost the city $217,152. For 1921, the company's figures are as follows:

Gross receipts	$11,773,004
Expenditure	
Operating expenses and taxes	6 375,283
Maintenance and renewal fund	2,529,055
Fixed charges	3,107,689
	$12,012,027
Deficit	$239,022

The valuation of the company is stated in the contract as $36,286,295. The company receives a 6 per cent return on its capital value, but pays 4½ per cent and 5 per cent on its bonds and thereby is able to pay a 10 per cent dividend on the par value of the capital stock. No dividends were paid the first year of the contract, but they were subsequently resumed.

The average fare in Montreal is 6.10 cents, the single fare zone measuring 68 square miles. The Montreal Tramways Company succeeded, in 1911, the Montreal Street Railway, which in turn had taken over the Montreal City Passenger Railway. The Montreal Tramways Company also absorbed the Montreal Park & Island Railway and the Montreal Terminal Railway.

Bus Operators Oppose Regulatory Measure

A new ordinance for regulating the operation of motor buses in Anderson, Ind., was introduced in the City Council recently and, after a first reading, there was a short debate among members of the Council. Further action on the ordinance was deferred until the next meeting of the Council body.

The measure introduced at Anderson is similar to an ordinance recently passed by the City Conucil at Muncie. It proposes that motor buses be prohibited from operating along streets traversed by city street cars. It also regulates the capacity of motor buses and provides for a license fee of $25 to $35 a year, according to the size of the vehicle. The ordinance also would require bus owners to furnish an indemnity bond or liability insurance.

The bus operators assert the measure is class legislation, and said they would take the matter into court, if the ordinance is passed. The Council indicated that the measure would be adopted at the next meeting. The bus operators contended that the ordinance is favorable to the Union Traction Company.

Ohio Line Fights Buses

The Maumee Valley Railways & Light Company, Toledo, Ohio, has started a war on the buses which operate between Toledo and the up-river towns of Maumee and Perrysburg. Officials of the railway, which has been operating under a receiver for a year, have informed both municipalities that it is a question of whether bus transportation or electric cars shall stay. If the buses are not barred from competing on the present basis the railway will withdraw its cars.

The railway officials say that the Perrysburg side of the valley line is losing $600 a day at present rates. The bus owners declared to members of the Perrysburg Council that they have only entered the business because of the demands from citizens for service. They claim to be able to save the average suburban workingman about $4 a month on his transportation to and from the city.

Bus Order Upheld

Toledo Vehicles Must Respect Order Barring Them from Downtown District

Buses in Toledo, Ohio, must continue to obey the order of Safety Director Gilson Light barring them from downtown streets, for the Court of Appeals has reversed the decision of Common Pleas Court by a vote of two to one.

The bus owners immediately announced that they would appeal the case to the Supreme Court, but city attorneys have pointed out that there is no way of appeal left open. The ordinance has been held constitutional by the Supreme Court already.

BUSES BARRED DOWNTOWN

The bus operators had contended that the order barring them from downtown streets deprived them of property without due process of law; that the order was unreasonable, and that the safety director had no power under the ordinance to issue the order. The majority opinion declared:

> The evidence offered on behalf of the city proves beyond all question that the restricted area is highly congested and that the operation of buses adds very materially to the congestion.
>
> If the order of the safety director was made wholly or in part with the view of furthering the safety of pedestrians in crossing the streets, it certainly is commendable.

The conclusion reached on the power of the director to exclude buses was as follows:

> It appears from the language above quoted (section of the ordinance) that the director of public safety has full power to establish routes and to exclude bus service from certain streets or parts of streets in the interest of public welfare, and that the regulation and control of buses operated for hire is imposed upon that official and that the ordinance gives to the director the power to require licensees to comply with the regulations established.

They also held that the order violated no constitutional right of the bus operators agreeing that a bus license did not confer a property right to them in the street.

Judge Chittenden did not concur with Judges Richards and Kinkade on the point of power granted to the director by the ordinance. He contended that the ordinance provided for appeal in the case of refusal of license and that if the section gave the director arbitrary power to define the routes it was a virtual annulment of appeal.

FEWER BUSES IN SERVICE

Street Railway Commissioner Wilfred E. Cann, who has been checking regularly the operations of buses, declared that the number in operation had dropped from about ninety to seventy since the order has been in effect.

January operations of the cars of the Community Traction Company will net about $6,500 after all fixed charges and apportionments to funds have been met.

Commissioner Cann is now preparing his annual report to be presented to Council when that body is organized to receive it. The deliberations of the Council have been held up by a fight in that body.

Industrial Class Plan For Subway

Peak Traffic Would Be Distributed Over Two-Hour Period Under Proposed System

Distribution of the peak traffic on New York city subway lines over a two-hour period may result in the use of a method whereby each class of workers begins and quits work at the same time. Daniel L. Turner, consulting engineer of the Traction Commission, hopes that with this method employers will not fear the proposed system, for one employer would compete on equal terms with another.

TENDENCY OF TRAFFIC ALWAYS CHANGING

Changes in the tendency of travel are most acute, of course, in the morning and in the late afternoon, according to Mr. Turner, or from 7:30 to 9:30 and from 5 to 7. Mr. Turner, in discussing his plan, said:

In the morning 9.7 per cent and at night 10.2 per cent of the total twenty-four-hour two-direction traffic is carried in one direction. This means that during the homeward rush hour at night, or during the most intensive hourly traffic period, more than 10 per cent of the total twenty-four-hour traffic is carried during less than 2 per cent of the total twenty-four-hour traveling period.

In the past, traffic on the street railway, subway and elevated lines in New York City has nearly doubled every fifteen years. The average daily traffic of all lines is now nearly 6,500,000. The total traffic carried during the year 1920 on all lines was approximately 2,365,000,000—approximately double the number of passengers carried on all of the steam railroads in the country. This was an increase over 1919 of nearly 285,000,000 passengers. Reduced to months, it means that during the average month of 1920, 23,000,000 more passengers were carried than during the average month of 1919; or, reduced to days, it means that during the average day in 1920, 750,000 more passengers were carried than during the average day in 1919.

4,200 ADDITIONAL PASSENGERS A DAY

Expressed in another manner, it means that on every day during 1920, nearly 4,200 more passengers were carried than on the preceding day. Or it means that the increase in traffic each day over the preceding day was equivalent to the capacity of nearly four 10-car subway express trains.

New facilities cannot be made available in less than five years. It is therefore of the utmost importance that the capacity of the existing facilities be utilized to the maximum extent possible. In my judgment there is no other single thing that can be done which will be as efficacious in enabling the existing facilities to do their maximum work as the spreading of the traffic peak.

Utilizing the existing facilities during the entire two-hour period to the same extent as they are utilizied during the maximum fifteen-minute period would enable the existing city-owned lines to carry 60 per cent. more passengers than they now carry. A transit line will develop during the twenty-four hours of the day an amount of traffic proportional to its traffic capacity at the peak of the traffic period. This would mean in the case of the Interborough alone, that it could carry 3,200,000 passengers instead of 2,000,000 passengers a day. But what this would really mean in the case of all city-owned lines can best be shown by measuring the increase in capacity with the cost of new facilities which would be necessary to provide for it with the present degree of use.

Contracts 1, 2, 3 and 4, covering all of the city-owned rapid transit lines in operation, have cost the city and companies together to produce to date approximately $454,000,000. Sixty per cent. of this is $272,000,000. A large portion of these facilities were constructed under pre-war prices. To reproduce them now would probably cost at least $500,000,000. Therefore, spreading the traffic peak evenly over the two hours morning and night would in this sense increase the capacity of the existing facilities as much as new facilities costing perhaps from $200,000,000 to $300,000,000 could represent.

Real estate will increase in value in the outlying districts under the new system, according to representatives of realty companies.

3,600,944 Fewer Passengers in Atlanta in 1921

A total of 93,210,072 passengers were carried by the Georgia Railway & Power Company, Atlanta, Ga., during 1921, whereas during the previous year 96,811,016 rode on the cars. Accidents of every sort were registered, and numbered 5,977, a decrease of 770 over the preceding year. Only one person was killed while riding on the cars of the company.

Other statistics given at the company offices included taxes which amounted to $916,764 as against $776,633 for 1920; number of employees on Dec. 31, 1921, 3,088; improvement of electrical service, $298,613; track and paving work, $258,079, and $358,741 for improvements in Atlanta and Decatur.

More Frequent and Cheaper Service Promised

Both cheaper and better service are promised the patrons of the Southern Cambria Railway, Johnstown, Pa., after March 1, according to a recent statement of George Palm, general manager of the company. Books containing 100 zone tickets will be reduced $1, that is from $7.50 to $6.50. There will also be smaller books for sale containing fifty-two tickets at a cost of $3.50. Special rates between Johnstown and South Fork and between Nant-y-glo and Ebensburg will be offered to workmen. Students' tickets will be lowered at the rate of 1 cent per zone.

There will be more frequent service provided for passengers. To facilitate freight handling and for the benefit of local shippers there will be a later freight service in the morning and afternoon.

746 Employees Enabled to Buy Homes

The United Railways Savings & Loan Association, St. Louis, Mo., has made application to the Secretary of State of Missouri to increase the capital stock from $4,000,000 to $5,000,000. The association, a separate corporation not affected by the receivership covering the United Railways, St. Louis, is composed of 5,000 employees of that company and members of their families. It has assets in cash and real estate mortgages totaling about $1,500,000.

The association was started six years ago with 125 charter members and capital stock of $1,000,000. Its growth has been steady, and the monthly receipts at present average more than $100,000. Through the association 746 employees have been enabled to build or buy homes, and others are building or buying at the rate of from ten to fifteen every month.

Six per cent interest is paid on savings deposits, and depositors are permitted to draw out their savings at any time without loss of principal. There are comparatively few withdrawals. Those who get building loans find that the net cost is less than 4 per cent. United Railways management furnished the association with offices rent free and contributes $200 a month toward overhead expenses.

Commission Activities to Relieve Traffic Congestion

Chief Engineer, H. Z. Osborne, Jr. of the Los Angeles, Cal., Board of Public Utilities declares in his report to the Board of the activities to date of the Greater Los Angeles Traffic Commission that Los Angeles must have subways under the central or congested section of the city. This commission is making a thorough study of the traffic problems of the city, and will recommend a step-by-step program to relieve the congestion in the city streets for the present and for the next fifteen years. The organization of this Commission was authorized by the Board of Public Utilities and the City Council as a means of bringing together in one body all the civic organizations and citizens interested in obtaining relief for the city's traffic problems.

Mr. Osborne states that one of the first steps he believes must be taken is to remove from the streets of Los Angeles the cars of the Pacific Electric Railway and to place them in subways so that these lines can furnish rapid transit to Hollywood, the beaches, the San Gabriel Valley cities, towns and other suburbs which they serve. He further states that with subways under the central portion of Los Angeles for much of the street railway traffic, Hollywood, Vineyard Station, Watts, Covina Junction and similar suburban points of the Pacific Electric Lines will become distributing stations where main-line suburban trains from the subways can distribute their passengers to all suburbs.

The Traffic Commission is also restudying the parking conditions in the downtown streets as they are so regulated by ordinance, and it is possible, considering the relation that the parking regulations downtown bear to the traffic congestion it will be recommended that even more drastic regulations be enforced than now exist, so that automobiles, street cars and pedestrians can move more rapidly in the downtown section.

City Will Appeal

According to an order of a district court sitting in the city of Helena, Mont., the Helena Light & Railway Company can abandon its Kenwood line which is being operated at a loss. The judge accordingly threw out the city's claim that according to its franchise the line cannot be abandoned. The city will appeal to the Supreme Court from the order authorizing the tearing up of tracks on this line.

Spartanburg Votes Against Amendments

By a vote of 639 to 320 the voters of Spartanburg, S. C., on Feb. 14 registered their protest at the polls to granting amendments to the franchise of the South Carolina Light, Power & Railway Company. The proposed amendments to the franchise were as follows:

1. The rate of fare therein provided shall be 7 cents.
2. The railway extensions provided for to Clifton Mill No. 3 and Whitney Mill is repealed.
3. Existing contract to repair the city as set forth in Section 5 of the said franchise shall continue, but the City Council is authorized to enter into such arrangements in connection therewith as it deems most advantageous to the city's interests.
4. That the maximum rate for gas shall not exceed the present rate of $2 per 1,000 cu.ft.

Many were prevented from voting because they had not paid their poll tax. Disappointment over the outcome of the election was expressed by G. B. Tripp, receiver of the property.

News Notes

Will Consider Electrification.—A request from interested municipalities for the electrification of the Galt-Elmira branch of the Grand Trunk Railway, which is now a part of the Canadian National Railway System, has been received by the dominion government at Ottawa.

Franchise Granted. — A twenty-year franchise was recently granted to the Chicago & Joliet Electric Railway, Joliet, Ill., by the Township Highway Commission. Officials of the road have announced improvements and changes in route. Ingalls Park will now have direct service.

Cost Up to Township.—The Mercer County (N. J.) Board of Chosen Freeholders has decided that the cost of relocating the tracks of the Trenton & Mercer County Traction Corporation Trenton, N. J., on the White Horse-Yardville road is up to the Hamilton Township Committee. The township committee granted the traction company the franchise for the paving of the tracks on one side of the road several years ago, but the township wants them removed to the middle so the road can be paved. The cost of relocating the tracks will cost about $45,000.

Want State Agency to Study Situation.—Creation of an authorized state agency to study the rapid transit problem in New Jersey is the goal now aimed for by the North Jersey Rapid Transit Committee. It has appointed a sub-committee to draw up a bill providing for the state agency, and will present it to the Legislature, probably on Feb. 23. The North Jersey Rapid Transit Committee came into existence Dec. 15 at a conference in Paterson, and has for its object increasing the speed, convenience and comfort of passenger service between New York and communities in northern New Jersey.

Columbia Men Strike.—Following the discharge of twenty-one employees of the Columbia Railway, Gas & Electric Company, Columbia, S. C., on Feb. 14 a strike was voted upon by the railway employees. On Feb. 16 no cars were running on the company's lines. F. H. Knox, president of the company, stated that he was preparing a statement explaining the company's position but that no plans had been made for the resumption of service. It is said that the company has been operating at a loss for some time and that officials intimated that relief would have to be forthcoming.

May Thwart Commission's Plans.—Legislation is to be introduced at the present session of the Legislature, Premier E. S. Drury has announced, which will curb the powers of the Hydro-Electric Power Commission of Ontario, of which Sir Adam Beck is the head. This is the outcome of the controversy between Beck and Drury regarding the advisability of establishing a system of municipally-owned hydro-electric radials in western Ontario, a government commission having reported against the project. The new legislation will make it impossible for the Hydro-Electric Commission to undertake the construction, acquisition or operation of radial lines.

Portland Improvements Planned.—The Portland Railway, Light & Power Company, Portland, Ore., is planning a number of improvements to follow its recent issue of stock. These include track and roadway changes to the amount of $250,000, installation of added tie-line capacity between substations, establishment of the outdoor type sub-stations as distribution centers; placement of new switching appliances on high tension lines; construction of new lines and enlargement of the capacity of power station. Approximately 1,800 employees of the company have subscribed for a total of $300,000 of the 7 per cent stock. The stock issue has been mentioned previously in the ELECTRIC RAILWAY JOURNAL.

Separate Commission Proposed for District of Columbia.—Senator Dela, chairman of the District of Columbia Committee, has introduced a bill creating a separate Public Utilities Commission for the National Capital. The present District Commissioners now act as a utilities commission. The new commission would be appointed by the President, two civil commissioners from among residents of the District who had lived there at least five years and one engineer commissioner from among the army engineer corps above the rank of captain. The first commissioners would serve two, four and six years, but subsequent commissioners six years. Their salaries would be $5,000 a year.

Decision Deferred.—The decision of the board of arbitration on wages and working conditions on the Springfield Street Railway and Worcester Consolidated Street Railway systems has been deferred. It was stated that a report might be made during the week beginning Feb. 26. The illness of Bentley W. Warren, representing the companies, hindered progress for a time. Testimony in the case was completed a short time ago, but numerous conferences have been found necessary before a decision could be made. The carmen are represented on the board by James H. Vahey, and the neutral member is James J. Storrow. The decision is understood to be binding on both sides.

Won't Oust Railway. — Prosecuting Attorney Walter H. Ruff, of Stark County failed in the Supreme Court to oust the Northern Ohio Traction & Light Company, Akron, Ohio, from its franchise granting it the right to to operate between Canton and Massillon. The company, maintaining a single track between the two cities sought from the county commissioners in 1919 a franchise for double track, agreeing to pay $75,000 in three installments, the last to be paid July, 1922. None of this money having been paid and no work on the project started by the company, the prosecuting attorney sought to oust the company. The Supreme Court refused to grant the ouster.

No Metric System Referendum.—No referendum on the adoption of the metric system in the United States will be taken at the present time, according to a resolution passed by the National Council of the Chamber of Commerce. The resolution against a referendum was passed at the meeting held in Washington recently. Edmund D. Fisher, chairman of the Chamber of Commerce committee on metric system explained that the committee is nearly equally divided on the question of the metric system itself, but is unanimous that it should go to referendum. George B. Chandler of the Connecticut Chamber of Commerce called attention to the fact that of all those who supported the metric system there was only one representative of industry. This statement noticeably influenced the Chamber of Commerce.

O'Shaughnessy Plan Recommended.—The plan of M. M. O'Shaughnessy, city engineer of San Francisco, Cal., for the extension of the San Francisco municipal railway lines into the Sunset district at a cost of $2,467,000, was recommended to the Board of Supervisors recently by its public utilities committee. The plan includes the construction of a tunnel under Buena Vista Park at a cost of $1,900,000. The board has already voted $500,000 for track extensions. Since last October, when the O'Shaughnessy plan was presented, the public utilities committee of the Board of Supervisors has been holding hearings on the proposed extension. Residents of the Sunset district have opposed the plan. The details of Mr. O'Shaughnessy's proposal were outlined in the ELECTRIC RAILWAY JOURNAL for Oct. 18, 1921, page 662.

Financial and Corporate

$1,314,853 Increase in Balance of North American Company

The North American Company, New York, N. Y., in its annual report for the twelve months ended Dec. 31, 1921, shows a surplus available for dividends amounting to $6,711,142, compared with $5,396,289 in 1920. This is sufficient to pay a year's dividends on the outstanding preferred stock and to leave a balance equal to $19.35 a share on the outstanding common stock, against $15.11 in 1920 figured on the same basis.

Details of the year's operations last year compared with 1920 are shown as follows:

	1921	1920
Gross earnings	$38,853,190	$39,611,162
Operating expenses and taxes	26,791,256	30,110,350
Net income	$12,061,934	$9,500,812
Other income......	307,196	208,673
Total income	$12,369,130	$9,709,485
Interest charges ..	4,603,114	3,459,305
Pfd. divs. sub. cos..	684,565	525,906
Minority interest in Wisconsin group	370,309	327,986
Total deductions...	$5,657,988	$3,313,197
Balance for depreciation divs., etc..	$6,711,142	$5,396,288

The report points out that of the total gross earnings for the year 25.19 per cent was derived from railway, 58.39 per cent from electric and heating, 5.68 per cent from gas and 10.74 per cent from coal operations. Of the total of $12,061,934 of net income 15.39 per cent was derived from railway, 75.20 per cent from electric and heating, 5.31 per cent from gas and 4.10 per cent from coal operations.

Investment in property and plant of subsidiary companies on Dec. 31, 1921, was $129,218,529, an increase for the year of $9,714,095.

Mention is made in the report of the increase in the capital stock during the year and the creation of a new issue of preferred shares, the par value of the old stock being reduced from $100 to $50 a share for both the preferred and common stocks. An offer was made in December to common stockholders to subscribe to additional stock amounting to $10,422,400 par value.

Plea to Have Boston "L" Bonds Made Legal for Savings Banks

Application has been made to the Massachusetts Legislature by James F. Jackson, chairman of the board of trustees of the Boston (Mass.) Elevated Railway to have the company's bonds declared legal for savings banks investments in Massachusetts. Under the present law the bonds do not come within the classification under the law which requires dividend payments of at least 5 per cent per annum over five consecutive years.

Chairman Jackson told the committee his company requires a large amount of money for new car shops and needed $3,000,000 to build and equip the buildings. It could save $350,000 of that sum by building now, he said, and if the necessary legislation could be secured, by making its bonds legal for savings banks it would tend to ease money conditions and he believed that the banks would invest in the bonds.

United Gas & Electric Reports Net Gain of $536,845

The United Gas & Electric Corporation, New York, N. Y., for the twelve months ended Dec. 31, 1921, earned the equivalent of $8.28 a share on its $9,284,000 first preferred stock, without taking into account the large earning accruing from its oil properties, which on Oct. 31 last showed a net after charges and depreciation amounting to $1,354,832.

While the gross earnings of the company's subsidiaries increased from $11,445,925 in 1920 to $11,898,645, a gain of $452,720, its net after taxes increased from $3,252,387 to $3,789,233, or $536,845. Earnings of the properties in December, 1921, were very satisfactory.

Reorganization Plan Approved by Commission

Another Step Taken at Pittsburgh Toward Rehabilitation of Traction Service There Under an Agreement With City Covering Operation for a Period of Ten Years

The Public Service Commission of Pennsylvania approved the agreement between the city of Pittsburgh and the Philadelphia Company for the reorganization of the Pittsburgh Railways. It is expected that other municipalities and boroughs surrounding Pittsburgh will now enter into a similar agreement. The city's agreement covers the operation of the railway system for a period of ten years.

The commission's decision stipulates that the "program must be effectuated" by Sept. 1, 1922. It also extends from March 1, 1922, to June 1, 1922, the time within which other municipalities joining in the agreement may select their representative on the traction conference board.

The agreement approved provides that the Philadelphia Company must proceed at once to reorganize the railways company or form a new company to take over the old company and convert all present mortgages into a single mortgage on the entire property of the company.

It is provided that the agreement shall not become binding until $5,000,000 is borrowed in the Pittsburgh district to be spent for "betterments, improvements and rehabilitation of the street railway system, subject to the approval of traction conference board."

Within the next thirty days the Philadelphia Company and the Pittsburgh Railways must take the steps necessary to have the receivers of the railways discharged at an early date and the property of the company returned to the re-organized or the new company.

A. W. Thompson, president of the Philadelphia Company, in a statement which he issued, said in part:

> All municipalities interested in the traction problem should, we believe, go along with Pittsburgh and immediately take steps to execute similar agreements with the company so that they may co-operate in the advantages of the plan.
>
> The new organization must raise $5,000,000 in the Pittsburgh district before this plan becomes operative.
>
> Whether or not it can raise the money depends entirely upon the citizens of the Pittsburgh district. If they will lend their support to the raising of this new money in the same way that they have supported the negotiations of the city, which resulted in a contract for the reorganization, the financing of this large sum of money is assured.
>
> As soon as the $5,000,000 is raised, the new organization will be in a position to purchase much needed new cars and immediately make improvements in the service.

The agreements provide that the company shall be allowed an annual net return of $3,750,000 on the public service commission's $62,500,000 valuation, of the company's property. This is at the rate of 6 per cent. In addition, the company is to be allowed the amount of money necessary to cover all operating expenses.

As to fares, the agreement says that if, at the end of any quarter, there is a surplus of "such amount as, in the opinion of the majority of the traction conference board would justify a reduction in the car fare," the city or any other municipality in the agreement shall have the right to apply to the Public Service Commission for a reduction in fare sufficient to eliminate the surplus, without objection on the part of the company. It is also provided that if it becomes necessary to increase fares at any time to meet requirements the company can make application for the increase without objection by the city or any other municipality in the agreement.

Persons holding claims or judgments against the company for personal injuries or death, sustained prior to the appointment of the receivers, the agreement provides during the next thirty days must agree in writing to accept payment, without interest, in annual instalments spread over a period of ten years, the first payment to be made within two years.

The new company agrees to assume claims arising during the régime of the receivers which may be ordered paid by the federal court having charge of the accounts of the receivers.

In lieu of the past system of the city and the company dividing the cost of repaving the streets carrying railway tracks the company agrees to pay a lump sum of $200,000 to the city yearly.

The company is to pay the city $100,000 annually in lieu of present agreements to pay various bridge tolls, street cleaning expenses and certain license taxes.

It is provided that the traction conference board shall consist of four members, two to be appointed by the Mayor with the consent of Council; one by the joint action of municipalities signing identical agreements with the company and one to be appointed by the company. The agreement says that in the event of other municipalities failing to select their representative by March 1, 1922, three members of the board shall be selected by the city of Pittsburgh. This provision is changed by the finding of the commission extending the time limit for other municipalities to June 1.

The salaries of the members and all expenses of the board are not to exceed $50,000 a year, the money to be paid by the company.

The details regarding the powers of the traction conference board have been published in detail previously. Briefly, the board is to supervise and control the expenditures of the company and in the event of either the city or the company not being satisfied with its decision, there is a provision for arbitration.

Another Step Taken Toward Spokane Consolidation

Advices from Spokane, Wash., indicate that an impediment has been removed that has blocked the negotiations for the consolidation of the railway lines of the Washington Water Power Company and the Traction system, and that the negotiations are immediately to be resumed. To effect consolidation it was found necessary for the Washington Water Power Company to take its car lines out from under its general mortgage and this required negotiations with financial interests in New York.

Efforts will be made to complete the details of consolidation so the matter may be submitted to the people at a special election on May 2 next. This will require preparing amendments to the city charter to modify the present franchise requirements, the circulation of a petition calling the election and the publication of the necessary election notices.

$254,339 Increase in Balance Available for Dividends in Louisville

The total revenue of the Louisville (Ky.) Railway was $4,469,502 in the year, as compared to $4,146,507 in 1920, and that of the Louisville Interurban $96,762 in 1921 compared with $126,930 in 1920.

The gross income of the two companies was $929,541, compared to $678,250. the year before. This is figured by deducting from the income the expenses of operations and taxes. Over $638,000 of the gross income was used to pay interest on notes and bonds, leaving the balance available for dividends $290,592. as compared with $36,253 the previous year. These and other facts were presented to the stockholders at the annual meeting on Feb. 15.

COMPARATIVE INCOME STATEMENT

	1921	1920
Revenue from transportation	$4,275,434	$3,962,206
Other operating revenues	194,067	184,300
Total operating revenues	$4,469,502	$4,146,507
Operating expenses	3,273,722	3,229,187
Net revenue from operations	$1,195,779	$ 917,319
Taxes	363,000	366,000
Operating income	$ 832,779	$ 555,319
Non-operating income:		
Louisville & Interurban Railroad net income	$ 87,884	$ 124,255
Other non-operating income	8,877	2,675
Total non-operating income	$ 96,762	$ 126,930
Gross income	$ 929,541	$ 678,250
Deductions from gross income:		
Interest on bonds and notes	$ 633,079	$ 632,790
Amortization of discount on notes	5,103	9,207
Miscellaneous debits	765	....
Total deductions	$ 638,948	$ 641,997
Balance available for dividends on stock	$ 290,592	$ 36,253

Another feature of the report which pleased the stockholders was the record of accident prevention. The cost of accident settlements fell from 6.4 per cent of the gross income in 1920 to 3½ per cent last year.

Mr. Barnes reviewed the litigation and said that the appraisal of the properties of the company by engineering experts valued it at more than $29,000,000. He told of the work of the Co-operative Welfare Association, the agreement of the employees to accept a reduction in wages and the election of D. L. Kehl, of the way department, to the board of directors.

The results of the operation for the year are shown in the accompaning income statement.

Application Made to Prevent Sale of American Cities Company Collateral

Application for an injunction was filed on Feb. 16 in the Civil District Court of Orleans parish by William J. Behen, Joseph Blum, J. C. LeBourgeois and Duralde Claiborne, representing, it is presumed, the committee of preferred shareholders of the American Cities Company opposed to the reorganization plan for that company. The action was brought against J. K. Newman, Lynn Dinkins and Archibald C. Kains, individually, and Messrs. Newman and Dinkins as members of the board of directors of the American Cities Company. It is sought to restrain the committee jointly with the Whitney Central Trust & Savings Bank, New Orleans, as trustee, from proceeding with the sale of certain securities in New York on Feb. 23. These securities it is alleged had been pledged as security for the eight-year 6 per cent collateral trust bonds issued by the American Cities Company in 1911.

The bonds issued by the American Cities Company in 1911 aggregated $10,000,000 and the collateral pledged for the issue consisted of securities of utilities companies in New Orleans and other southern cities. It had been alleged by the bondholders that the American Cities Company had defaulted not only in interest but on the principal, and the securities were ordered to be sold. The sale of the securities, it is alleged, would bring not much more than $12,000,000.

It is further alleged that a plan had been worked out in conjunction with representatives of the bondholders to effect the reorganization, which, if consummated, "would cause the plantiffs herein, as well as all the other holders of the common and preferred stock, to lose their entire investment, amounting to more than $30,000,000."

Conspectus of Indexes for February, 1922

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Feb. 1922 **7.16**	Jan. 1922 **7.20**	Feb. 1921 **7.20**	May 1921 **7.24**	**4.84**
Street Railway Materials*	Jan. 1922 **157**	Dec. 1921 **159**	Jan. 1921 **202**	Sept. 1920 **247**	**100**
Street Railway Wages*	Feb. 1922 **214**	Jan. 1922 **215**	Feb. 1921 **232**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	Jan. 31 1922 **4.24**	Dec. 31 1921 **4.27**	Jan. 31 1921 **7.57**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	Jan. 1922 **11.58**	Dec. 1921 **12.99**	Jan. 1921 **12.92**	March 1920 **15.54**	Av. Mo. 1913 **6.12**
Business Failures	Jan. 1922	Dec. 1921	Jan. 1921	Jan. 1922	Av. Mo. 1913
Number	**2,705**	**2,380**	**1,998**	**2,705**	**1,213**
Liabilities (millions)	**115.3**	**76.34**	**74.95**	**115.3**	**24.64**

	Latest	Month Ago	Year Ago	Peak	1913
U.S. Bur. Lab. Stat. Wholesale Commodities	Jan. 1922 **148**	Dec. 1921 **149**	Jan. 1921 **177**	May 1920 **272**	**100**
Bradstreet's Wholesale Commodities	Feb. 1 1922 **11.42**	Jan. 1 1922 **11.37**	Feb. 1 1921 **12.37**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	Feb. 1 1922 **165.0**	Jan. 1 1922 **164.4**	Feb. 1 1921 **185.8**	May 1 1920 **263.3**	**120.9**
Annalist Wholesale food	Feb. 18 1922 **173.2**	Jan. 21 1922 **164.3**	Feb. 19 1921 **185.1**	June 12 1920 **329.2**	**140**
U.S. Bur. Lab. Stat. Retail food	Jan. 1922 **142**	Dec. 1921 **150**	Jan. 1921 **172**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	Feb. 1 1922 **157.7**	Jan. 1 1922 **161.4**	Feb. 1 1921 **176.3**	July 1 1920 **204.5**	(1914) **100**

*Computed by Mr. Richey.

The Opening Gun in New York Railway Valuation

Transit Commission Valuation Bureau Recommends Net Valuation of $465,680,154, Which Is About 60 per Cent of the Par Value of Outstanding Securities, Less than 60 per Cent of the Book Value and Less than Half of the Total Capitalization—Valuation Hearings to Commence March 6

THE valuation of the New York City traction lines recommended to the Transit Commission by its Bureau of Valuation, announced on Monday of this week, brought forth reactions which varied all the way from the reported statement of a traction official, "Thank God, there are still courts," to that of the city's corporation counsel, John P. O'Brien, who said it is "grossly excessive by many millions of dollars." The figure recommended by John H. Madden, valuation engineer, and Fred W. Lindars, chief accountant, is $465,680,154 as the net valuation to be placed on the properties of the forty transit companies proposed for inclusion in the commission's plan of reorganization. This figure does not include non-operating property, which the Bureau of Valuation considers to be worth something over $20,000,000.

This value is to be compared with a total capitalization of $1,123,885,592; with a book value, representing the companies' own valuation, of $791,450,841; with a par value of the securities held by the public of $765,094,365 (the difference between this and the capitalization represents various company holdings which the commission's Bureau of Valuation has excluded from consideration); and with a market value of the securities held by the public of $426,060,095 as of Feb. 1, 1922, but with the following securities on which market quotations could not be secured —$25,236,429 held by the public and $158,481,099 held by the companies, par value in both cases.

The figure recommended by the bureau is only one of four presented. This one is based on what the bureau calls "original costs," but which is really an appraised value based on prices at the time of installation. From the total value thus obtained the bureau has subtracted something over $55,000,000, which is the estimated expenditure necessary to place the property in first-class operating condition, and thus obtains the $465,680,154 which it recommends as the net valuation. The other three figures presented are:

1. Original cost (appraised value as above described), less straight line depreciation...	$425,360,145
2. Appraised value, 1910 - 1914 prices, less depreciation.....	437,724,313
3. Appraised value, 1921 prices less depreciation	571,048,271

Accompanying tables show details of the bureau's valuation upon which it bases its recommendation as to net valuation; also, the details of the various bases of valuation as applied to the different companies and also a summary statement of the securities outstanding against the various companies with their market value. These tables tell most of the story as to the conclusions which the Bureau of Valuation reaches. They are gathered together from the first volume of the report of the Bureau of Valuation, which volume in itself resembles, as one person has stated, a book of wallpaper samples in its size. Table after table, unending masses of data and statistics, are presented by the bureau to indicate not only its conclusions but also the prices and statistics upon which these conclusions are based.

There is still to be prepared a fifth set of figures showing the estimated future earning capacity of each of the railroads, upon the basis of the 5-cent fare and present conditions of management. The transit act requires that due regard shall be given to such an estimate in fixing the figures at which the properties will be taken over. The commission has expressed the opinion, however, that this set of figures will not materially change the aggregate allowance.

THE SIGNIFICANCE OF THE VALUATION FIGURES

The figures here presented are, of course, the report of the Bureau of Valuation to the Transit Commission on the value of the physical property. This report has been handed to all of the several companies affected, to the various groups of security holders, to the city officials and to others interested, and a series of hearings will be held, commencing March 6, for the presentation of other facts and arguments, after which the commission will make its decision as to the valuation of the properties. This decision, Chairman McAneny announced, will be included as a part of the general and final recommendations of the Transit Commission as to a rehabilitation plan in New York City and not before.

Whatever valuation is finally adopted, however, will be the amount which will be allowed to the companies in new securities of a general holding or owning and operating company, in which all of the lines will be gathered together.

If the recommendation of the Bureau of Valuation is accepted, it will mean that the companies will be allowed in the new securities only the amount of money which the Bureau of Valuation estimates has been expended in actual construction of the properties. The exact plan, Chairman McAneny announced on Monday, is as follows:

> It will be proposed to the companies that they vest title to their several properties in the city; that the consideration of these transfers shall be the issuance to them in return of an equivalent of value in the securities of the new controlling company that is to be brought into existence under the plan, and that the further consideration shall be that the several individual companies that are to be brought within a unified system and grouped in the manner the commission has proposed shall receive back new leases, under which they will continue to operate privately, but under the terms, financial and otherwise, fixed by the plan and under the general direction of the proposed Board of Control. It is not proposed, in short, that the acquisition of the properties by the city shall be upon the basis of payment in cash. The new securities, properly guaranteed, will provide the sole basis of exchange, and the valuations have been required to be made in order to determine the amount of such securities that will go to each company. Each company in turn accepting the plan will be required to take care of its own old securities of whatever value, whatever extent, in its own way, and through a reallotment to the old holders of the new bonds.

Commissioner McAneny then proceeded to say that the report of the bureau presented at the hearing had been made public as soon as received by the commission with a view toward acquainting all who are interested with its contents and to afford to each as much time as possible for a preliminary study of its recommendations before fixing the date for a general public hearing.

Most of the hearing on Monday was taken up with an examination of Valuation Engineer John H. Madden by Judge Shearn, counsel to the commission. Mr. Shearn desired to establish by the testimony of Mr. Madden the manner in which the valuation estimates had been prepared. In addition to the volume of tables and statistics already mentioned, Mr. Madden presented three other volumes:

1. A report of the cost of the Manhattan Railroad extension, and additional track authorized by the certificate granted to the Interborough Rapid Transit Company for elevated extension and certificate granted to the Manhattan Railway Company for additional tracks dated March 19, 1913.

2. The determination of the chief engineer under the contract dated March 19, 1913, between the city and the Interborough company of the cost paid or accrued to March 31, 1921, of Contract No. 3, together with the report of the cost of operation to the same date.

3. The determination of the chief engineer under the contract dated March 19, 1913, between the city and the New York Municipal Railway Corporation, known as Contract No. 4, of the cost paid or accrued to March 31, 1921, together with the report of the cost of operation to the same date.

Mr. Madden testified that his "original cost" figure was really an appraised value, using prices as of date of installation in so far as obtainable, but checked against company records when they were available. In this connection he said that he had been given free access to all company records available.

He further indicated that he had used the "yard-stick" method of valuation in that typical sections of structures had been selected and applied to the stretches to which these typical sections pertained.

Franchise, going value and value of all leases were not considered in arriving at the final figure.

Mr. Madden also gave his argument as to why he thought the original cost

RAPID TRANSIT AND SURFACE RAILROADS—NEW YORK CITY
SUMMARY COLLECTED FROM TABLES IN REPORT OF BUREAU OF VALUATION TO THE TRANSIT COMMISSION
SHOWING CAPITALIZATION RECOGNIZED BY THE BUREAU (COMPANY HOLDINGS OF SECURITIES BEING ELIMINATED),
BOOK VALUES OF PHYSICAL PROPERTY, AND VALUES ASSIGNED BY THE BUREAU IN ITS RECOMMENDATIONS.

Name of System or Company	Capital Stock, Funded Indebtedness, etc., as at June 30, 1921(a)	Gross Book Values of Fixed Capital Assets, Including Materials and Supplies, June 30, 1921	Appraised Value Based on Prices as of Date of Construction Including Both Operating and Non-operating Property	Appraised Value Based on Prices as of Date of Construction, Operating Property Only	Expenditures Necessary to Place Property in First Class Operating Condition	Net valuation recommended, Operating Property Only—Appraised Value Based on Prices as of Date of Construction Less Expenditures Necessary to Place Property in First Class Operating Condition
Brooklyn Rapid Transit System						
Brooklyn Rapid Transit Surface Lines						
Brooklyn Heights Railroad Company		$13,506,443.05	$810,357	$769,582	$85,469	$684,113
Bridge Operating Company		100,734.55	....	....	....	....
Bklyn, Queens County and Suburban R. R. Co		11,431,567.20	4,878,536	4,474,045	1,122,849	3,351,196
Coney Island and Brooklyn R. R. Co.—owned and leased lines		9,611,765.53	6,515,342	5,525,989	1,354,121	4,171,868
Nassau Electric Railroad Co.		34,867,625.76	12,254,156	11,540,755	3,313,216	8,227,539
Brooklyn Rapid Transit Company		17,204,212.99	24,119,528	23,654,969	2,048,553	21,606,416
Total Receivership Companies—surface lines		86,722,349.08	48,577,919	45,965,340	7,924,208	38,041,132
Brooklyn City Railroad Company		19,837,534.41	21,290,292	20,431,352	4,843,508	15,587,844
Coney Island and Gravesend Railway Company.		251,479.62	446,112	446,112	75,614	370,498
South Brooklyn Ry. Co.—owned and leased lines		4,031,189.08	5,159,603	5,086,153	573.868	4,512,285
Total B. R. T. surface lines.		110,842,552.19	75,473,926	71,928,957	13,417,198	58,511,759
Brooklyn Rapid Transit Elevated and Subway Lines						
New York Consolidated R. R. Co.—Original property		58,497,742.45	25,927,194	24,761,992	2,357,117	22,404,875
New York Municipal Railway Corporation						
Contract 4—construction and equipment			41,672,294	41,672,294	(k) 1,230,918	40,441,376
Reconstruction of existing railroad			19,302,186	19,302,186	(k) 75,262	19,226,924
Additional tracks			8,194,726	8,194,726	(k) 13,659	8,181,067
Elevated extensions			5,161,567	5,161,567	(k) 10,696	5,150,871
Undistributed costs			691,805	691,805	....	691,805
Total N. Y. Municipal Railway Corp.		$78,650,983.73	$75,022,578	$75,022,578	(k) $1,330,535	$73,692,043
Total B. R. T. elevated and subway lines		$137,148,726.18	$100,949,772	$99,784,570	$3,687,652	$96,096,918
Grand total Brooklyn Rapid Transit System	(b) $232,175,073 64	$247,991,278.37	$176,423,698	$171,713,527	$17,104,850	$154,608,677
Interborough Rapid Transit System—Subway and Elevated Lines						
I. R. T. Company—Contracts 1 and 2, subway		$57,204,245.58	$43,898,479	$43,898,479	(k) $7,887,251	$36,011,228
I. R. T. Company—contract 3, subway		108,473,910.16	101,483,864	101,483,864	(k) 1,825,537	99,658,327
Total I. R. T. Company Subways		$165,678,155.74	$145,382,343	$145,382,343	(k) $9,712,788	$135,669,555
I. R. T. Company—elevated lines	$235,250,400.00	$21,386,607.89	$21,239,406	$21,239,406	(k) $35,617	$21,203,789
Additional tracks		13,082,856.70	12,963,265	12,963,265	(k) 509,430	12,453,835
Elevated extensions		5,633,129.78	5,642,679	5,642,679	(k) 1,011,297	4,631,382
Manhattan Power Plant Improvements		5,633,129.78	5,642,679	5,642,679	(k) 1,011,297	4,631,382
Additions to Existing Manhattan Railroad		264,627.91	264,627	264,627	(k) 2,132	262,495
Total I. R. T. Company—elevated lines		$40,367,222.28	$40,109,977	$40.109,977	(k) $1,558,476	$38,551,501
Manhattan Ry. Co.—Original Elevated Property	(c) $105,199,439 02	$113,001,414.41	$64,019,835	$62,417,138	$5,042,933	$57,374,205
Total I. R. T.—Manhattan Ry. elevated lines		$153,368,636.69	$104,129,812	$102,527,115	$6,601,409	$95,925,706
Grand total I. R. T. System—subway and elevated lines	$340,449,839.02	$319,046,792.43	$249,512,155	$247,909,458	$16,314,197	$231,595,261
New York Railways System						
New York Railways Co.—owned lines		$76,266,487.80		(l)	$4,382,009	....
New York Railways Co.—leased lines		30,852,556.83		(l)	4,603,254	....
Total New York Railways Company	(d) $990,580,445.19	$107,119,044.63	$44,334,048	$35,068,875	(m) $12,401,773	$22,667,102
Eighth Avenue Railroad Company	1,636,200.00	6,475,762.12	4,702,524	3,910,766	1,105,843	2,804,923
Ninth Avenue Railroad Company	800,000.00	3,171,331.33	2,373,571	2,373,571	197,365	2,176,206
New York and Harlem Railroad Company.	(e) 2,850,544.00	(e) 2,317,468.26	3,695,499	3,695,499	1,471,945	2,223,554
Total New York Railways System	$95,667,189.19	$119,083,606.34	$55,105,642	$45,048,711	$15,176,926	$29,871,785
Third Ave. Railway System						
Third Ave. Railway Company		$34,887,093.56	$21,002,994	$20,100,654	$2,362,223	$17,738,431
Kingsbridge Railway Company		2,276,168.17	1,060,305	1,060,305	26,500	1,033,805
Third Ave. Bridge Company		113,108.64	....	....	....	....
Belt Line Railway Corporation		1,965,269.88	1,849,064	1,831,559	81,978	1,749,581
Dry Dock, East Broadway and Battery Railroad Company		4,343,090.91	2,678,168	1,966,279	242,250	1,724,029
42nd Street Manhattanville and St. Nicholas Ave. Ry. Co.		12,573.533.15	3,761,821	2,988,132	429,633	2,558,499
New York City Interborough Railway Co.		7,049,124.48	1,954,093	1,954,093	216,359	1,737,734
Southern Boulevard Railroad Company		707,232.60	428,097	428,097	16,800	411.297
Union Railway Company		9,840,898.48	6,966,802	6,874,577	599,263	6,275,314
Bronx Traction Company		702,858.81	854,044	854,044	31,200	822,844
Mid-Crosstown Railway Company		161,063.48	185,446	185,446	366,700	(D) *181.254*
Pelham Park and City Island Railway Co.		82,789.64	101,650	101,650	4,500	97,150
Total—Third Avenue Railway System	(f) $68,599,961.25	$74,702,231.80	$40,842,484	$38,344,836	$4,377,406	$33,967,430
Second Avenue Railroad Company	(g) 10,722,000.00	(g) $8,308,443.29	$5,404,882	$5,320,882	$522,565	$4,798,317
Staten Island Companies						
Richmond Light and Railroad Companies	(j) $1,342,756.94	(j) $3,055,622.41	$3,607,622	$3,553,915	$430,972	$3,122,943
Southfield Beach Railroad Company	249,800.00	301,813.12	....			
Staten Island Midland Railway Company	2,000,000.00	2,341,642.46	925,165	856,467	170,973	1,092,770
Dept. of Plant and Structures, New York City	262,959.65	3,591.98	407,276	407,276	....	....
Total—Staten Island Companies	$3,855,516.59	$5,702,669.97	$4,940,063	$4,817,658	$601,945	$4,215,713

(*Table continued on next page*)

(*Table continued from page* 334)

Name of System or Company	Capital Stock, Funded Indebtedness, etc., as at June 30, 1921 (*a*)	Gross Book Values of Fixed Capital Assets, Including Materials and Supplies, June 30, 1921	Appraised Value Based on Prices as of Date of Construction Including Both Operating and Non-operating Property	Appraised Value Based on Prices as of Date of Construction, Operating Property Only	Expenditures Necessary to Place Property in First Class Operating Condition	Net Valuation Recommended, Operating Property Only—Appraised Value Based on Prices as of Date of Construction Less Expenditures Necessary to Place Property in First Class Operating Condition
Queens Borough Companies						
New York and Queens County Railway Co.	$6,235,000.00	$8,922,229.48	$4,962,366	$4,739,055	$781,673	$3,957,382
Long Island Electric Railway Company	1,200,000 00	1,617,590.31	725,209	725,209	213,531	511,678
New York and Long Island Traction Company	2,000,000 00	2,472,803.92	826,497	619,996	163;425	456,571
Ocean Electric Railway Company	354,288 69	512,061 16	372,270	372,270	103,300	268,970
Manhattan and Queens Traction Corporation.	(*h*) 1,431,647.34	690,692.72	1,125,824	1,125,824	239,831	885,993
New York and North Shore Traction Company	(*i*) 1,753,850 00	1,642,379.94	824,545	171,382	126,212	45,170
Total—Queens Borough Companies	$12,974,786.03	$15,857,757.53	$8,836,711	$7,753,736	$1,627,972	$6,125,764
Miscellaneous Companies						
Manhattan Bridge Three Cent Line	$450,000.00	$485,964.25	$353,861	$353,861	$41,716	$312,145
Van Brunt Street and Erie Basin Railroad Co.	200,000 00	272,097.11	218,622	218,622	33,560	185,062
Total—Miscellaneous Companies	$650,000 00	$758,061.36	$572,483	$572,483	$75,276	$497,207
Grand Total—all companies	$765,094,365.72	$791,450,841.09	$541,638,118	$521,481,291	(*n*) $55,801,137	**$465,680,154**
City's Investment—Subways						
Contracts 1 and 2 (I. R. T.)	....	.	$62,767,713	$62,767,713	(*k*) $91,657	$62,676,056
Contract 3 (I. R. T.)	...	.	88,086,508	88,086,508	(*k*) 27,517	88,058,991
Contract 4 (B. R. T.)	....		142,801,094	142,801,094	(*k*) 42,902	142,758,192
Total—City	....	. ..	$293,655,315	$293,655,315	(*k*) $162,076	$293,493,239
Combined Total—companies and city			$835,293,433	$815,136,606	(*o*) $55,963,213	$759,173,393

NOTES:—(*a*) Includes capital stock, bonded debt, certificates of indebtedness, receiver's certificates and construction advances.

(*b*) Excludes bonds $103,106,316, stocks $39,325,632, certificates and construction advances $42.279,388—held among system companies.
(*c*) Excludes acquired bonds $7,560,98.
(*d*) Excludes securities of subsidiary companies held by N. Y. Rys. Co. vis.:—Stocks $7,161,300 and bonds $3,151,342.
(*e*) Arbitrary apportionment to Street Railway Division as made by State Tax Commission.
(*f*) Excludes securities of subsidiary companies held by 3rd Avenue Ry. Co. viz.: Stock $10,276,000, bonds $10,835,339, Const. advances $14,511,785.
(*g*) Combining reports of Receiver and Company and including adjustments conforming with U. S. Circuit Court decisions.
(*h*) Includes Judgment Notes $1,411,647.34 as per Company's annual report.
(*i*) Includes Receiver's certificates $4,500,00 shown in annual report.
(*j*) Excludes lighting department fixed capital and materials and supplies $3,776,493.06 and eliminates bonds and stocks in similar total amount.
(*k*) Represents accrued depreciation.
(*l*) Not separately computed.
(*m*) Includes $20,970 Electrical and Mechanical Equipment and $3,395,540 rolling stock not distributed among the various companies in the New York Railway System.

(*n*) Accrued depreciation, company investment $12,601,799
Expenditures necessary to place property in first class condition 43,199,338
$55,801,137

o) Accrued depreciation, company investment $12,601,799
Accrued depreciation, city investment 162,076
Expenditures necessary to place property in first class condition 43,199,338
$55,963,213

(*D*) Negative value.

COMBINED TABLE SHOWING SEVERAL BASES OF VALUATION—OPERATING PROPERTY ONLY—FOR PURPOSES OF COMPARISON

(Another Basis, that of Prospective Earning Power, is still to be reported.)

Name of System or Company	Appraised Value Using Prices as of Date of Construction	Appraised Value Using Prices as of Date of Construction Less Depreciation	Appraised Value 1910-1914 Prices	Appraised Value 1910-1914 Prices, Less Depreciation	Appraised Value 1921 Prices	Appraised Value 1921 Prices, Less Depreciation	Net Valuation Recommended — Appraised Value Using Prices as of Date of Construction Less Expenditures Necessary to Place Property in First Class Operating Condition
Brooklyn Rapid Transit System							
Surface lines (including Brooklyn City Co.)	$71,928,957	$46,526,562	$80,041,741	$51,066,180	$141,400,157	$86,746,640	$58,511,759
Elevated and subway lines	99,784,570	90,635,855	99,666,842	90,432,501	119,734,821	103,182,865	96,096,918
Total B. R. T. System	$171,713,527	$137,162,417	$179,708,583	$141,498,681	$261,134,978	$189,929,505	$154,608,677
Interborough Rapid Transit System—Subway and Elevated							
I. R. T. Co. Contramcts Nos. 1, 2 and 3	$145,382,343	$135,669,555	$145,382,343	$135,669,555	$145,382,343	$135,669,555	$135,669,555
I. R. T. Co. elevated lines	40,109,977	38,551,501	40,109,977	38,551,501	40,109,977	38,551,501	38,551,501
Manhattan railway original elevated property	62,417,138	43,293,409	60,128,434	41,924,656	98,970,808	63,805,290	57,374,205
Total I. R. T. and Manhattan elevated lines	$102,527,115	$81,844,910	$100,238,411	$80,476,157	$139,080,785	$102,356,791	$95,925,70
Grand total I. R. T. system	$247,909,458	$217,514,465	$245,620,754	$216,145,712	$284,463,128	$238,026,346	$231,595,261
New York Railways System (including 8th, 9th and N. Y. & Harlem R. R. Co.)	$45,048,711	$32,968,506	$50,795,754	$36,952,949	$90,756,522	$64,674,624	$29,871,785
Third Ave. railway system	38,344,836	25,618,242	44,357,474	29,456,174	82,095,169	53,817,386	33,967,430
Second Ave. railway company	5,320,882	3,737,280	6,577,544	4,539,165	12,788,952	8,805,364	4,798,317
Staten Island companies	4,817,658	3,219,323	5,318,521	3,507,445	8,625,192	5,402,727	4,215,713
Queens Borough companies	7,753,736	4,698,894	8,582,595	5,198,676	16,266,184	9,676,258	6,125,764
Miscellaneous companies	572,483	441,018	570,089	425,511	1,010,475	716,061	497,207
Grand total all companies	$521,481,291	$425,360,145	$541,531,314	$437,724,313	$757,140,600	$571,048,271	**$465,680,154**
City's investment subways							
Contracts 1 and 2 (I. R. T.)	$62,767,713	$62,676,056	$62,767,713	$62,676,056	$62,767,713	$62,676,056	$62,676,056
Contracts 3 (I. R. T.)	88,086,508	88,058,991	88,086,508	88,058,991	88,086,508	88,058,991	88,058,991
Contracts 4 (B. R. T.)	142,801,094	142,758,192	142,801,094	142,758,192	142,801,094	142,758,192	142,758,192
Total City	$293,655,315	$293,493,239	$293,655,315	$293,493,239	$293,655,315	$293,493,239	$293,493,23
Grand totals, companies and city	$815,136,606	$718,853,384	$835,186,629	$731,217,552	$1,050,795,915	$864,541,510	$759,173.39

RAPID TRANSIT AND SURFACE RAILROAD COMPANIES — NEW YORK CITY

Summary Statement showing the amount of Capital Stocks, Bonds, Certificates of Indebtedness, etc., outstanding June 30, 1921, the proportions thereof held by the Public and within the Systems respectively, together with the Market Values thereof at September 1, 1921, and with the Market Value of the totals as of Feb. 1, 1922.

	Capital Stocks — Quoted on Market						Bonds and Secured Notes — Quoted on Market								
	Held by Public		Held by System		Total Capital Stocks		Held by Public		Held by System		Total Bonds and Secured Notes		Grand Total Stocks and Bonds		
	Par Value	Market Value	Par Value	Market Value	Par Value	Market Value	Par Value	Market Value	Par Value	Market Value	Par Value	Market Value	Par. Value	Market Value (Sept 1, 1921)	Market Value (Feb. 1, 1922)
Brooklyn R. T. System	$87,138,343	$12,044,036	$18,281,657	$4,560,364	$105,420,000	$16,604,400	$139,426,328	$76,621,864	$90,231,572	$29,166,686	$229,657,900	$105,788,550	335,077,900	$122,392,950	$149,149,812
Interborough Con. System	110,403,634	28,338,614			110,403,634	28,338,614	300,609,400	144,457,875	12,660,000	5,154,708	313,269,400	149,612,583	423,673,034	177,951,197	212,868,905
New York Railways System	9,615,246	6,378,410	17,530,358	306,251	27,145,604	6,684,661	69,081,685	12,416,885	1,041,341	218,682	70,123,026	12,635,567	97,268,630	19,320,228	25,101,972
Third Avenue Railway System	16,840,000	2,484,812			16,840,000	2,484,812	51,119,000	24,198,500	3,057,500	1,532,300	54,176,500	25,730,800	71,016,500	28,215,612	35,816,175
Second Ave. R. R. Company							8,771,000	727,831			8,771,000	727,831	8,771,000	727,831	1,261,631
Manhattan Bridge 3c. Line															
Staten Island Companies							2,711,000	1,362,600			2,711,000	1,362,600	2,711,000	1,362,600	1,186,600
Queens County Companies							1,650,000	675,000			1,650,000	675,000	1,650,000	675,000	675,000
Totals	$223,997,223	$49,245,872	$35,812,015	$4,866,615	$259,809,238	$54,112,487	$573,368,413	$260,460,555	$106,990,413	36,072,376	$680,358,826	$296,532,931	$940,168,064	$350,645,418	$426,060,095

Capita l Stocks, Bonds, etc., on which market quotations could not be secured

	Held by Public	Held by System	Total	
Capital Stocks	$12,749,425	$73,427,175	$86,176,600	
Bonds and secured notes, etc.	9,645,911	11,202,289	20,848,200	
Certificates of indebtedness, receiver's certificates, etc.	2,841,093	73,851,635	76,692,728	
	$25,236,429	$158,481,099	$183,717,528	$183,717,528
Total capitalization				$1,123,885,592

less expenditures necessary to place the property in first-class operating condition was the logical one to adopt.

CITY'S REPRESENTATIVE PRESENT

For the first time the city was represented at the hearing by special Assistant Corporation Counsel Mr. DeFord. There was apparently a desire on the part of both Mr. DeFord and the commission to co-operate, so far as the city saw itself legally able to do so, in determining the valuation. Mr. DeFord made it plain, however, that in his appearance he did not waive any contention of the city as to the various points which had been raised as to the constitutionality of the act creating and outlining the activities of the Transit Commission. It was agreed that Mr. DeFord would have ample opportunity to present any objections or testimony which would be pertinent to the determination of the valuation of the properties.

There were very few interested persons who would hazard a comment on the valuation figure presented, every one indicating that the mass of figures presented was so great as to require several days study before an adequate expression could be given.

As was to be expected, however, the city officials decried the figures as being excessive, Mayor Hylan saying, in Palm Beach, Fla., that "it is well known that the purpose of the Transit Commission is to unload if it can at an enormous value the traction junk on the taxpayers of the city. We are preparing, in the interests of the taxpayers, vigorously to oppose this traction scheme." Corporation Counsel J. P. O'Brien said: "This principle is obviously unsound . . . Without attempting at this time to analyze this amount, which is grossly excessive by many millions of dollars, there should be deducted in any event an amount equal to all of the depreciation due to wear and tear, decay and the antiquated character of the plants, structures and equipment."

In transit circles the figures announced apparently were much less than had been expected, as they were far below the values of the different properties as carried on the companies' books. However, no comments from traction representatives could be obtained. All that they would say was that the ten-day period which the commission allowed for examination for the report was all too short. James L. Quackenbush, counsel to the Interborough Rapid Transit Company, said: "I am dizzy from reading figures." He thought it would be at least thirty days before he could be ready to discuss the valuation.

Meanwhile, the commission has set further hearings on the valuation for March 6, at 2 p.m.

Municipal Line Earning Profit

Pekin, not China but Illinois, is doing well with its municipal electric railway. At least James P. St. Cerny, Corporation Counsel of the city, says so, and then he proceeds with facts and figures to prove it. The data with respect to the road in Pekin were furnished by Mr. St. Cerny in reply to a request from another city situated similarly to Pekin with respect to transportation.

The railway at Pekin consists of 3.5 miles of track. The fare is 5 cents, six tickets for 25 cents and during the fiscal year ending April 30, 1921, the receipts of the company amounted to $32,183, enough to pay all running expenses and to make a payment of $8,381.06 on the bonds and interest thereon by which the city originally bought the property for a total of $48,000.

During the years which the city has owned the line, the street railway fund has been able to accumulate a surplus above its current expense and interest charges of $17,255, but nothing had been charged to depreciation and when it became advisable to buy three new cars in 1920 the cost, $17,940, practically wiped out the surplus which had been accumulated. The road pays no taxes, of course, being a municipal plant, and officials feel sure that the profit in operation will more than pay for the depreciation.

The company pays 41½ cents an hour, $110 a month to its motormen, and $120 a month to its superintendent. The total force employed consists of six motormen, one superintendent and a night and a day man at the carhouse, salaries ranging from $80 for the night man to $120 a month for the superintendent. The company buys its electrical power for about $275 a month.

The company uses one-man safety cars, gives a fifteen minute service and has five cars in "active" operation. Mr. St. Cerny says:

> The city has refunded to the property owners in and along the paved streets, 7 ft. of the pavement, 3½ ft. being returned to each property owner abutting on the line of the improvement which was a term of ordinance and incorporated therein, and was absolutely paid from the earnings of the company.
>
> The city is building a new carhouse that is of modern structure and recently let under contract for construction for $6,646. All of these matters are paid for absolutely in cash, and the city of Pekin has not for the past four years ever made an overdraft on any fund in its departments.
>
> There is one feature of our system that has not been decided upon: that is the question of depreciation. The entire system is new, and the surplus will clearly verify the statement of sufficient funds being accumulated from the earnings to pay all operating and maintenance expenses, and a sufficient sum for depreciation.
>
> The city at the present time contemplates building an extension of the line, to tap a section of the city where the workmen reside. The high prices maintained in the steel market and labor conditions do not warrant the construction of the extension at this time.

Detroit Surplus $190,444

The annual report of Detroit (Mich.) United Railway for year ended Dec. 31, 1921, shows net income after interest, depreciation and federal taxes, of $865,444, equivalent to $5.62 a share earned on the $15,375,000 capital stock. This compares with net income of $1,233,575, or $8.22 a share on the $15,000,000 stock outstanding in the previous year. The consolidated income account for the year 1921 compares with 1920, as shown in the table above.

	1921	1920
Gross earnings... .	$23,329,067	$28,986,228
Operating expenses...	19,428,779	25,025,165
Net earnings.... .	$3,900,288	$3,961,063
Other income......	716,225	676,118
Total income.. ..	$4,616,513	$4,637,181
Interest and taxes...	3,351,068	3,003,606
Depreciation and fed tax reserves...... .	400,000	400,000
Net income.......	$865,444	$1,233,575
Dividends..........	*675,000	1,200,000
Surplus..........	$190,444	$33,575

*Includes $375,000 paid in stock.

Authorization Given for Local Abandonment

By a recent decision of the Colorado Public Utilities Commission the Trinidad, Electric Transmission, Railway & Gas Company, Trinidad, Col. has received permission to abandon service on certain city lines. The order becomes effective on March 12. The lines to be abandoned are the Baca Street, San Pedro line and the West Main Street branch. Interurban cars only will after March 12 run into the city via Central Park, San Juan Street, and through Pine and Commercial Streets to Main Street.

In November last the company notified the City Council of the financial loss sustained in the operation of these lines and told of its intention to apply to the commission for abandonment permission. The chamber of commerce and City Council opposed the grant. This matter has been referred to previously in ELECTRIC RAILWAY JOURNAL.

Thrift Plans a Huge Success

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has established a high record for thrift among its employees with 86 per cent of them now holding stock in the Employees' Mutual Benefit, Savings, Building & Loan Association. At present 4,387 individuals hold more than 91,000 shares of the stock, making an average holding of 20.9 shares per person. The association now has a capital stock of $10,000,000 and plans to increase this in the near future to $15,000,000.

The association is the most rapidly growing Building & Loan Association in the State of Wisconsin. Money can be left for 6 per cent paid up stock at any time and the stock is taken back again and money refunded upon demand. The Building & Loan Association was started in 1914, and at the close of that year its total assets were about $57,000. Its present assets are almost $3,000,000. There are more than 1,000 mortgage loans now outstanding, totaling $2,780,000. All of these loans were made to employees desiring to buy homes. Two classes of stock are issued by the association. Class A stock requires a payment of 50 cents a share per month and matures in about eleven years. Class C stock requires a payment of $1 a month per share and matures in six or seven years.

Officers of the Building & Loan Association are: G. W. Van Derzee, president; W. F. Lathrop, vice-president; E. J. Evans, secretary; George W. Kalweit, treasurer. In addition to these the following are directors: A. J. Killa, Henry Scheife, Henry Wolf, W. W. Cook and Charles Unrath.

Action for Forfeiture of Franchise Asked

Refusal to comply with the request that he draft an ordinance for forfeiture of the franchise of the Cincinnati (Ohio) Street Railway, held by the Cincinnati Traction Company as a lessee, was contained in a letter sent to Attorney Robert S. Alcorn by Saul Zielonka, City Solicitor. In a letter to the city solicitor recently, Attorney Alcorn demanded that an ordinance be drafted for passage by the City Council to forfeit the franchise held by the traction company. Mr. Zielonka pointed out that a number of the items set forth in Attorney Alcorn's request as causes for forfeiture are now in the courts. The solicitor also calls attention to the fact that the City Council recently enacted a resolution calling for the creation of a citizens' committee to make an exhaustive investigation of the traction situation.

$925,000 Paid for Carhouse Property

At public auction recently, the carhouse properties of the New York (N. Y.) Railways, located on Madison Avenue between Eighty-fifth and Eighty-sixth Streets, were sold for $925,000. M. Turner Brockway was the successful bidder. He intends to construct a family hotel at an estimated cost of between $1,000,000 and $3,000,000.

The sale of the property was conducted in connection with the receivership preceedings instituted by the Guaranty Trust Company and the American Brake & Shoe Foundry Company. If for any reason the sale is set aside, it was announced, the plot would be reoffered on March 16. At the same time the company's property on Thirty-third Street between Lexington and Fourth avenues will be offered for sale.

Notice of Stock Increase Filed

The Gary & Valparaiso Railway, Gary, Ind., has increased its capital stock to $130,000, according to papers filed recently wth the Secretary of State at Indianapolis.

Financial News Notes

Asks to Sell $300,000 of Preferred Stock.—The Indiana & Michigan Electric Company, South Bend, Ind., operating in St. Joseph, Elkhart and other counties in Indiana and Michigan, asked the Indiana Public Service Commission for authority to sell $300,000 of its preferred stock at par to reimburse the company's treasury for expenditures made in improving its plants.

Passenger Traffic Decreases.—For the month of January, 1922, the Philadelphia (Pa.) Rapid Transit Company realized a net income of $234,400 against $162,794 for the same month a year ago. The passenger revenue for the month amounted to $3,363,926 against $3,552,152 in January, 1921. The number of passengers reported as carried by the company decreased from 71,205,892 in January, 1921, to 68,147,370 in January of this year.

Utilities Bear 89 Per Cent of Tax Increase.—According to figures compiled at the offices of the State Tax Commission of Ohio the public utility companies of the State appear to have borne 89 per cent of the increase in Ohio's grand tax duplicate for 1921. It is shown that while the grand tax duplicate for the State was increased $72,378,741, the state tax commission added $64,437,110 of this increase to the total tax valuation of the public utility properties.

Refunding Issue Offered.—Lee, Higginson & Company, Parkinson & Burr and Estabrook & Company, are offering an issue of $1,700,000 of 7 per cent secured gold notes, series "A," of the Galveston-Houston Electric Company, Houston, Tex., dated Feb. 1, 1922, and due Aug. 1, 1925. The proceeds of this sale will be used to refund the outstanding three-year 7 per cent gold notes, due March 1 next, and will provide sufficient working capital for present requirements. The notes are being offered by the banking houses at 99½ to yield about 7.15 per cent.

Hearings on Abandonment Concluded.—Hearings were concluded before the State Public Utilities Commission on Feb. 15 at Columbus, Ohio, on the petition of the Indiana, Columbus and Eastern Traction Company, to abandon its Lima-Defiance, Junction-New Carlisle and Columbus-Orient branches. Among the interests engaged in fighting the petition were the National Refining Company, Cleveland. Protests were based chiefly upon the fact that industries built up along these branch lines would be greatly injured by withdrawal of the service, and that many people living along the lines depended upon the electric railways as operated for some years as their principal means of transportation.

Traffic and Transportation

Commission Replies to Mr. Stephens

Answers Governor's Letter on California Rate Decision—Must Be Unhampered, It Says

The California State Railroad Commission replied on Feb. 10, to Governor Stephens' recent letter suggesting that it reconsider rate increases granted the Pacific Electric Railway and the Southern Californa Telephone Company. The commission declared that the value of regulation would be destroyed "by even the suspicion that decisions were affected by any other consideration or influences than the real merits."

CONDITIONS JUSTIFY ADVANCE

In response to the Governor's letter saying that in view of the general fall in prices a decline in rates might be expected, the commission addressed him a letter stating that conditions justified the advance, the telephone company not having had an increase in five years and the railway having been given only partial relief in the past from higher costs.

The commission's letter considers the case in its broader application when it says:

> Far exceeding in importance any question involved in these particular cases, your letter raises the fundamental issue of regulation established by the people of this State. The success of this system, as you point out, depends on public confidence and understanding. But it equally depends on full freedom under the law to do exact justice, uninfluenced by any other consideration whatsoever. You state that you are concerned for the preservation of regulation of public utilities. A like sense of our own responsibility for regulation impels us to reply that while regulation may be weakened by the temporary or local unpopularity of some decisions, it would be destroyed by even the suspicion that decisions were affected by any consideration or influence other than real merits involved, ascertained after full and careful consideration of all the facts.
>
> Regulatory bodies should not be swerved from doing justice because of public criticism any more than they should be misled by the selfish claims presented by corporations. The Commission desires public approval, but it believes the only way it can secure or retain public approval is by being fair and just. If it must choose between right or being temporarily unpopular, it must choose being right.

LETTER SIGNED BY ALL COMMISSIONERS

The commission's letter, signed by all five commissioners H. W. Brunidge, H. D. Loveland, Irving Martin, Chester H. Rowell and H. Stanley Benedict, referred to the growth of public utilities during the last decade of regulation, and in part said:

> During this period the utilities were permitted to earn a fair return and nothing more, but that fair return permitted them to function and to provide necessary service. At the same time every citizen has received additional direct and substantial benefits in lower rates than would have been possible had the present system of regulation not been in effect. No greater disaster could possibly occur in California than to weaken public confidence in regulation.
>
> Your statement that a decline in rates might reasonably be expected with the general fall of prices, is correct, provided rates had previously advanced with advancing costs. In neither of the cases in question was this true. The Pacific Electric had been given partial relief under Federal control. The case of the Pacific Electric has been pending since 1918. If the present rate structure had been put into effect at that time when the justness of the advances was generally conceded, no question of the apparent inconsistency would have arisen.
>
> Instead, at the request of the cities served by the Pacific Electric, the commission made a complete valuation of the property as well as an exhaustive service report.
>
> This appraisal and report required eighteen months to complete. Los Angeles, of course, gained by reason of this long period of deferred reasonable rate adjustments.
>
> The new rates on the Pacific Electric will not provide a single dollar for dividends on stock. The basis on which the rates are computed is $16,000,000 less than the total borrowed money upon which the company must pay interest. The increases allowed the Pacific Electric will not repay any of the losses which this company suffered during the period of low rates. Furthermore, the new rates on the Pacific Electric were made contingent upon the company's spending $2,600,000 new capital for improvement of service. This money has been secured since the decision was issued.

Governor Stephens in his letter to the commission referred to the valuation figures given before the Legislature on the King tax bill by the officials of the Pacific Electric and other great public utility corporations. The commission answered that in this rate proceeding it acted on its own valuation, which was over $20,000,000 less than that claimed by the company in this case.

The reply continues:

> You are, of course, entirely right in your statement that the King tax law had no effect on the Pacific Electric, and was negligible in the case of the telephones rates. This statement the commission has already published in the Los Angeles press.

REGULATORY PROCEDURE ADEQUATE

> In all cases this commission must look beyond the mere question of present rates to that of permanent service. In an expanding State like California, service can keep pace with demand only by the constant investment of new capital, but this could not be supplied from earnings except by rates which this commission snould not and does not allow. This outside capital cannot be had unless the companies are permitted to earn enough to pay interest on it, and adequate service cannot be rendered without it. The experience of the two companies now under discussion illustrates the disaster to service which results when inadequate rates are charged.
>
> The policy that has governed in the past is the policy that governs the present commission. So long as we are members of this commission we will be governed by principles of equity and justice and perform our sworn duty regardless of consequences. We propose to fix fair rates—and that means fair both to the rate payers and to the utility—upon established facts uninfluenced by feeling or favorites.
>
> The application for rehearing of the Pacific Electric and telephone cases did not convince the commission that the rates provided in the decisions should be suspended. These rates were made contingent upon the companies spending large amounts of new capital to improve service, and when the companies accepted these conditions, and secured the money for this purpose, it did not appear to be in the interest of the general public to suspend rates.
>
> The members of this commission boldly and confidently assert that no better, fairer or more equitable system than that of regulation as it now exists has been suggested by any person, or, in fact, can be devised.

Weekly Pass for Fort Wayne

Adopted After Careful Study of Results Obtained in Youngstown and Other Cities

The Indiana Service Corporation through its president, Robert M. Feustel, has gained permission from the State Public Service Commission to put into effect a weekly pass system on the Fort Wayne city lines.

The company at Fort Wayne plans on making a six months' trial of the new system, selling the pass for $1. The old system of four checks for 25 cents will still be in effect for those who desire it. The petition calls for starting the plan on or before March 13.

Mr. Feustel stated that the results of the operation of the pass in Racine and Kenosha, Wisconsin, and in Youngstown, Ohio, have been watched very carefully by the transportation department of the company at Fort Wayne. Numerous trips have been made to these cities to obtain the complete data as to the opinion of the public, car operators and the officials of the companies on the use of these passes and it was found that all three of these groups were very enthusiastic about them. In explaining the matter for the benefit of the local public at Fort Wayne Mr. Feustel said:

> The use of these passes in the other cities has greatly speeded up operation. The patron makes only one financial transaction a week with the car operator; no transfers are issued or need to be issued on the pass. This means that the patron merely holds the pass in his hand, shows it to the operator when walking by and because of the distinct color and large identification number of the pass it can be readily identified by the operator. This very materially decreases the time of loading cars and is an important factor in speeding up the service.
>
> Of course the greatest benefit is that it provides a method for giving a lower rate to the frequent rider. Many of our patrons indicated that they rode three or four times daily every week and oftentimes used the cars in the evenings to go to the movies and on Sundays to go to church. The new rate will mean that anyone who rides twenty times weekly gets a 5-cent fare; a 4-cent fare for the party who rides twenty-five times weekly and down as low as a 3⅓-cent fare for those riding thirty times weekly. The pass being perfectly transferable means that any member of the family can use it, or any friend. The only limitation being that not more than one person can be carried on it at any one time, and it must be used within the week designated on the ticket.
>
> As stated in our letter to the Mayor, this company earned 7.4 per cent on the actual investment in the Fort Wayne city lines in 1921. It is of some interest to note that when the 7-cent fare case was tried in February, 1921, the city's experts estimated that the company would make a net revenue of $309,000, while the company estimated that it would make a net revenue of $224,000. The actual net revenue for 1921 was $214,000. Both, the company and the city's experts overestimated the amount of revenue which would be obtained in 1921. The company's estimate as to the actual net after operating expenses were paid was within $10,000 of the actual results. Unfortunately the company was also over optimistic in its estimates, as the net was $10,000 below what it expected the year's business would yield, while the actual net revenue was $95,000 below what the city estimated.
>
> This reduction in fare is, as stated, aimed to stimulate business in order that we may get this property up to and keep it at a full 8 per cent return. This rate will be needed if we are to keep up with the expansion of the city, and the consequent needs for new capital.
>
> It is our belief that the Fort Wayne city lines are on the right road and if we can get enough double track to operate our cars frequently with the new rates, we can put the Fort Wayne system up to what everybody in the city wants it to be—the best system in the country in any city the size of Fort Wayne.

Connecticut Experiment Continued

Figures of Results in Norwalk and Bridgeport With Five-Cent Fare Are Tabulated

Although the ninety-day period allowed by the Public Utilities Commission at Hartford, Conn., for the 5-cent fare experiment on the lines of the Connecticut Company in Norwalk expired on Feb. 6 and the same period allowed for the Bridgeport division expired on Feb. 20, the experiment will probably be continued throughout the month, at least, according to a statement of Chairman Higgins, of the Public Utilities Commission. It is also probable that the decisions of the commission regulating fares on both divisions will be handed down at the same time, according to Chairman Higgins. At the time the experiments were started the Public Utilities Commission reserved the right to continue them beyond the three months period if it saw fit.

Bridgeport

	Receipts.	Decrease.
Nov. 26	$32,799.69	$6,461.89
Dec. 3	34,156 29	5,105.29
Dec. 10	34,829.31	4,432.27
Dec. 17	36,177.36	3,084.22
Dec. 24	38.747.98	513.60
Dec. 31	36,121.18	3,140.40
Jan. 7	36,666.43	2,595.15
Jan. 14	37,028.87	2,232.71
Jan. 21	36,376.72	2,884.86
Jan. 28	36,146.43	3,115.15
Feb. 4	35,480.43	3,781.15
Feb. 11	35,110.52	4,151.06
Feb. 18	35,445.85	3,815.73

Norwalk

	Receipts.	Increase.
Nov. 19	$5,179.47	**$408.77**
Nov. 26	4,857.38	**730.86**
Dec. 3	5,088.84	**499.40**
Dec. 10	5,324.36	**263.88**
Dec. 17	5.659.38	71.14
Dec. 24	5,966.30	378.06
Dec. 31	5,232.74	**355.50**
Jan. 7	5,487.82	**100.42**
Jan. 14	5,729.68	131.44
Jan. 21	5,749.41	161.17
Jan. 28	5,667.94	79.70
Feb. 4	5,715.04	126.80
Feb. 11	5,706.43	118.19
Feb. 18	5,675.16	86.92

Note—Boldface denotes decrease.

According to the order and ruling of the commission the Connecticut Company has reported weekly on the results of the operating receipts. For the purpose of comparison the company gave the figures and receipts for the week preceding the date on which the order for the test went into effect in its report to the commission. Whether the system will be continued in the two cities after the expiration of the trial test is a matter that is entirely up to the Connecticut Public Utilities Commission to decide. Starting on March 1 a new schedule of fares on all lines of the Connecticut Company other than these two will go into effect, three rides for a quarter or a reduction of fare of 16 per cent.

A decrease in receipts is shown in every week of the test up to the present time from the Bridgeport lines. The amount of decrease ran from $514 in the week of Dec. 24, when the receipts were materially increased by holiday travel, to $6,462 during the week of Nov. 26. There was a greater fluctuation in the income from the fares in Norwalk. On the lines in that city there was a decrease shown in the receipts for six weeks and an increase in each week for eight weeks. The figures for each week in Bridgeport and Norwalk so far as they have been reported are shown in the accompanying table.

Agreement in Sight Between City and Railway

With a view to giving the Hamilton (Ont.) Street Railway the financial help it needs, members of the Civic Street Railway Committee recently recommended that an agreement between city and railway be arranged whereby the company is authorized to charge a straight 5-cent fare for the remainder of 1922 and thereafter, at the wish of the City Council providing it gives an adequate service and makes necessary repairs to roadway. E. P. Coleman, general manager of the property, stated that if a permanent agreement were reached and assurance was given that a 5-cent fare would remain in force then the company would guarantee to make all necessary repairs.

Lynchburg Company Permitted to Charge 6-Cent Fare on Interurban Lines

A 6-cent fare on interurban lines of the Lynchburg Traction & Light Company, Lynchburg, Va., was ordered by the State Corporation Commission on Feb. 16. The fare was formerly 5 cents.

The commission stated that the financial troubles of the company, which conducts a general lighting and gas business in addition to its electric railway service, were due to the railway operations. Figures upon which the commission bases its decision show that in this department the return in 1919 was 6.09 per cent, but that this fell in 1920 to 3.54 per cent and in 1921 to 13-100 of one per cent.

Following previous utility decisions the commission refused to grant such an increase in rates in the electric and gas service departments that the deficit in the railway department would be taken care of. Electric rates for lighting on the overhead system were advanced from 8 to 9 cents per kw.-hr. for the first 100 hours. Fractional increases were granted in rates for power. The gas rate permitted to be charged by the company was increased in August, 1921, by 30 cents per 1,000 cu.ft.

The traction company petitioned the commission for an 8-cent fare outside the city limits of Lynchburg, after the City Council had refused the company a 6-cent fare on its city lines. The commission, in August, continued the interurban 5-cent fare for six months, and the present ruling follows the trial period. The commission stated that a 6-cent fare should prevail on all the lines of the system.

Tri-City Wants Monthly Ticket

The Tri-City Railway of Iowa, Davenport, has asked for the monthly ticket system in Davenport. This followed after the motion of the company that the present fare injunction be dissolved was denied. The injunction order was issued in May, 1920, but under a modification the company was allowed to charge a 9-cent cash fare for adults, or 35 cents for four tickets. In June, 1921, the trolley company voluntarily reduced the fare to 8 cents straight.

The effect of the court's refusing to dissolve the injunction is to continue the present rate until the legality of the city ordinance is settled. This ordinance fixes the railway fare. Judge A. J. House of the Scott County District Court stated that the case involved the legal question of the power given to the cities by the Legislature to enter into contracts for fixing rates.

The ticket system which the company asked for is in effect in parts of Illinois, on the other side of the river from Davenport. In its motion asking for the adoption of the ticket system, the company asked for the following:

For passengers more than twelve years of age, the fare shall be 8⅓ cents if paid for by the use of tickets or tokens sold at the rate of four for 25 cents.

Fares may also be fixed at the rate of 5 cents for each cash fare if the passenger holds a monthly identification card costing 50 cents, good only for fares paid during the month for which the card is issued.

For those passengers who do not have tickets or tokens and who are not holders of the monthly identification cards, the company is authorized to charge 1⅔ cents over and above the ticket fare of 8⅓ cents for each cash fare, making a total of 10 cents for such fares.

Children from five to twelve years will be charged a fare of 4 cents, while all children under five years may ride free if accompanied by parent or guardian.

Transfers will be issued according to the existing rules.

Muskegon Ruling to Be Tested

A friendly action has been started to test the authority of the city commission of Muskegon, Mich., in ordering the discontinuing of the bus lines between Muskegon and Muskegon Heights in accordance with the special election held on Dec. 15. The police have arrested George Tarr, an owner of a Muskegon Heights bus. Under the plan one witness will be sworn and Mr. Tarr will be found guilty. A fine or jail sentence will be given and Mr. Tarr will go to jail. Then the attorney for the bus owners will go into the circuit court and ask for a writ of habeas corpus to obtain the release of the defendant. The question will then be tried out in the circuit court on its merits and it is planned to take the issue to the Supreme Court.

Since the action of the City Commission in ordering the buses to discontinue operation went into effect, there has been some discussion as to the validity of the city ordinance. The bus owners decided to take action.

It will be the first test made in the State in this regard and it is considered important. The city will base its claims on the decision of the United States Supreme Court and state courts.

Negotiations Suspended Temporarily for Operating Frankford Elevated

In the face of another demand from Mayor Moore of Philadelphia, Pa., for legislation to enable the city to operate the Frankford elevated, members of City Council clearly indicated on Feb. 16 that it was their intention to make terms with the Philadelphia Rapid Transit Company on the basis of the company's last offer, if Thomas E. Mitten remains in control of the property.

A message from the Mayor asking for the necessary legislation was referred to the committee of the whole at the session of Council. In the discussion that followed it was stated that the stock battle now going on between five directors and Mr. Mitten for control of the company had forced a temporary suspension of negotiations over the Frankford line.

Councilman Weglein upon being asked to explain the present status of the negotiations said that any hope of getting an immediate return of 5 per cent on the city's investment from the P. R. T. was a "will-o'-the-wisp and a mirage."

He is quoted as follows:

> Negotiations had reached the stage where a guarantee had been given of through service from Frankford to Sixty-ninth Street with free transfers and a 7-cent fare. The only point to be determined was the amount to be paid the city. A counter proposition to that offered by the P. R. T. was made, calling for a payment of 1 per cent to the city the first year and an increase of 1 per cent a year until 5 per cent was reached.
>
> Negotiations are now dormant because of the internal battle for control of the company. I do not know anything of the merits of that controversy. The Mayor seems to have taken one side, Colonel Potter the other, and Mr. Trigg, the other city director, is neutral.
>
> We will know after March 15 with whom we have to deal. In the meantime I see no advantage to be gained in providing for an extension on Market street for a single orphan line. I believe the people want this line operated as part of the Philadelphia Rapid Transit unified system.

Government Won't Back Radials

The Government of Ontario, if reports of the recent caucus are correct, proposes to wash its hands entirely of hydro-radial affairs. The authority for this statement is the Toronto *Globe*. That paper says the Government of Ontario will not guarantee bonds issued by municipalities, or unions of municipalities, for the acquisition or construction of radial railways. It will not hereafter provide money to be spent on the preparation by the Hydro-electric Commission of reports upon hydro-radial projects. It will not prevent the municipalities which launch hydro-radial projects at their own risk from asking Sir Adam Beck or any other person who is a member of the Provincial Hydro-electric Commission from acting as Commissioners in the management of municipally owned Radials, but they must do so as the appointees of the municipalities, and not of the Government of Ontario. The *Globe* said:

> If the proposed legislation, when introduced, sets aside existing statutes regarding hydro-radials to the extent indicated, it will render necessary a very radical change in the organization built up during recent years under the Hydro-electric Commission to stimulate the use of electric energy in Ontario.

Electrification May Follow Shoals Development

W. A. Mapother, president of the Louisville & Nashville Railroad, wants to see Muscle Shoals developed as a power site. He said so very plainly a few days ago in addressing the members of the Chamber of Commerce at Birmingham, Ala.

Anything that is good for the South is good for his road, said Mr. Mapother, despite the fact that the report had gained circulation that the Louisville & Nashville Railroad feared the loss of haulage of coal that development of the power site might entail through reducing coal consumption.

Mr. Mapother is quoted as follows:

> If Mr. Ford should have a surplus of water power after serving his own plants at Muscle Shoals, the Louisville & Nashville would like to make trial of electricity in railroad operation. The branch from Sheffield to Columbia would be ideal for it. We might try it as far as Nashville. On the Sheffield branch we have steep grades that permit a heavy locomotive to haul small loads only. It would be a splendid opportunity there to try out electricity in the operation of railroad trains over difficult grades.

North Shore Line Seeks Private Right-of-Way

The Chicago, North Shore & Milwaukee Railroad has petitioned the Illinois Commerce Commission for a certificate of convenience and necessity to construct tracks on a new private right-of-way through Wilmette, Illinois. After leaving the private right-of-way of the elevated lines through Evanston, the cars of the North Shore line operate through the village of Wilmette, which is the second suburb north of Chicago, on the streets.

This short stretch of track of the railroad, subject to the regulations of the village, has been a source of many restrictions upon the railroad operations. The new right-of-way has already been largely negotiated. Opposition to the petition developed at the first hearing and the case was continued until March 17.

"Try Old-Time Courtesy"

Signs bearing these words have been attached to the front of all cars operated by the South Covington & Cincinnati (Ohio) Traction Company. The company management is seeking to encourage courtesy as the watchword among the throngs which assemble in the Dixie Terminal during the rush hours.

The latest issue of "Green Line Topics," a bulletin issued weekly to the patrons of the traction line, contained the following suggestion:

> Let's adopt the suggestion of a Green Line patron and get back to old-fashioned courtesy by letting women passengers board cars first, just the same as you would do with a member of your own family.

Endeavors to Ascertain Rights for Regulating Utilities

Since the recent increase in passenger rates on the Pacific Electric Railway's Lines, as granted by the California State Railroad Commission, the Los Angeles Board of Public Utilities has always been governed by the "gentlemen's agreement" under which the State Railroad Commission and the Board have worked together in the regulation of the service rendered in Los Angeles by the telephone, street railways, gas and other public utility corporations.

Commissioner Kennedy of the Board in endeavoring to sweep aside this agreement contends that the city under its charter has supreme power to regulate the service rendered by the public utilities inside of the city, and that the State Railroad Commission has jurisdiction only over the matter of the rates to be charged. The resolution of Commissioner Kennedy, which was unanimously adopted by the Board, is as follows:

> Whereas, the Supreme Court of the State of California has held that the California State Railroad Commission has jurisdiction in the matter of fixing rates; and,
>
> Whereas, the city of Los Angeles, in the opinion of the Board of Public Utilities, has jurisdiction over all matters of service rendered by the public utilities, other than the fixing of rates; and,
>
> Whereas, we believe grave danger may come to the city of Los Angeles through either loss of powers or disuse of powers which our City Charter prescribes,
>
> Therefore, be it resolved, by the Board of Public Utilities of the city of Los Angeles that the interests of the city of Los Angeles are best served by contesting all exercise of jurisdiction in the city of Los Angeles by the Honorable California Railroad Commission other than the fixing of rates,
>
> Therefore, be it further resolved, that the Honorable Mayor of the city of Los Angeles be and is hereby requested to confer with the City Attorney and determine upon a policy which will clearly define the rights of the city under our charter, and settle for all time the question of jurisdiction and the control within the city of corporate interests.

Another Five-Cent Champion

Senator William E. Martin of Buffalo, is sponsor for the so-called 5-cent fare bill in the upper house of the New York Legislature. In a statement Senator Martin declares that sentiment for a 5-cent fare is sweeping the State Senator Martin said recently:

> The 5-cent fare bill will be passed if the people of the State will give it their support. No legislator dare defy public demand and opinion. I urge voters to write to their representatives and demand that they support this measure.
>
> From all parts of the State I am receiving letters complaining against the hardships of 7, 8 and 10-cent fares and asking me not to let up in the fight. I have been approached by agents for traction companies and asked if I was in earnest with this measure. I think that I have made my stand clear to these gentlemen.
>
> I shall insist that my bill be reported from committee. I know there are scores of legislators whose hearts are in their mouths for fear the bill will be reported and that they will be put on record. To put them on record is just what I shall seek to do.

Boston's Mayor Plans for 5-Cent Fare.—Mayor Curley, Boston, Mass., is now planning his campaign for a 5-cent fare. He has held several conferences with other city officials on the subject of the best way to proceed.

Requires Railway to Reduce Fares

The City Council of Little Rock, Ark. has passed an ordinance requiring the Little Rock Railway & Electric Company to reduce its fares from 6 cents to 5 cents. The ordinance is to become effective on March 15. The measure repeals the ordinance passed eighteen months ago granting the company the right to charge a 6-cent fare for one year. The reason given for the passage of the ordinance is that the year has expired during which time the company was given the right to charge 1 cent extra for each fare, due to increased costs of operating. By a City Council ordinance the legal fare for the city of Little Rock is 5 cents, it is said.

C. E. Smith, an engineer of St. Louis, filed a report with City Attorney Clifford on an appraisal of the property of the Little Rock Railway & Electric Company. He was employed by the city to prepare the report so that the report could be used by the city in fighting the company's request for a 7-cent fare. The City Attorney last year refused the request of the railway for a 7-cent fare. The company then filed suit asking an injunction prohibiting the city from interfering with the collection of the fare. Hearing on the case was delayed pending completion of the report of Mr. Smith.

D. H. Cantrel, president, states that unless certain radical changes are made in the franchise of the company, the company will be forced to cease operations. The clauses of the franchise to which he objects require the company to do considerable paving, costing in the neighborhood of $550,000, it is said, and also require a system of free transfers, the sale of tickets to school children at half fare, furnishing free transportation to city employees, and paying to the city a certain per cent of gross receipts for the first 50 years of its existence.

The 1921 session of the Arkansas legislature abolishing the Arkansas Corporation Commission gave jurisdiction in intra-city rate matters to the cities themselves, hence the order of the Corporation Commission fixing the fares of the company at 6-cents is subject to repeal by the Council, it is said.

Testimony Heard in Chicago Fare Reduction Case

Testimony on cost of living was introduced by the city before the Illinois Commerce Commission during the week ended Feb. 18 to show why the rate of fare should be lowered on the Chicago Surface Lines. Officials of large industrial concerns and department stores stated that prices of their products had been decreased in the last two years. Some evidence was also given to the effect that labor is cheaper and more efficient at the present time.

Evidently fearing a political reaction, the city's lawyers carefully refrained from suggesting that wages of employees of the surface lines should be reduced.

Representatives of the trainmen's union were present during the hearings and said they would want to cross-examine witnesses later.

Another part of the session was devoted to testimony concerning cost of money and rates of interest, the city seeking to show that the present return of 7½ per cent allowed the surface lines is excessive. Attorneys for the companies showed by cross-examination that high grade utility securities are getting fairly high returns.

At a meeting held on Feb. 17 the City Council directed the local transportation committee to report at the next meeting on the possibility of getting a start on subway construction in the near future.

Transportation News Notes

Hearing Scheduled on Lower Fares.—Hearings are taking place in Chicago before the Illinois Commerce Commission on the petition of the City of Rockford for lower fares on the lines of the Rockford City Traction Company. The railway is opposing the proposition whereas the city is of the opinion that the figures of railway operation for 1921 are evidence why the fares should be decreased.

Testimony Ended in Duluth Case.—The Minnesota Railroad & Warehouse Commission has concluded the taking of testimony in the case of the Duluth Street Railway, which is asking for increased fares in Duluth. Arguments in the case will be heard by the commission Feb. 28, but a decision is not to be expected before May, it was stated. The hearing covered the valuation of the company, the rate of return and the form in which that rate is to be secured.

Will Hear Fare Petition.—The Public Utilities Commission of Connecticut will hold a hearing at the State Capital on Feb. 23 on the petition of the city of New Britain to require the Connecticut Company to reduce fares in that city from 10 cents to 6 cents without transfers. The petition states that the 10-cent fare is "discriminatory and more than just, reasonable and adequate to provide properly for the public convenience, necessity and welfare."

Seven-Cent Fare Ordered in Johnstown.—A universal 7-cent cash fare for the Johnstown (Pa.) Traction Company has been ordered by the Public Service Commission. This abolishes the special ticket rate of four tickets for 25 cents. The company asked that the 7-cent cash fare be raised to 8 cents and that it be allowed to charge 30 cents, instead of 25 cents for four tickets. The order is dated March 1, 1921, and has just been published.

Indianapolis Deserts Skip-Stop.—The skip-stop system on the lines of the Indianapolis Street Railway has been abandoned. The system was started two weeks ago on order of the Mayor, but was never popular. The company had nearly completed the marking of its poles along the streets, showing where the cars stopped under the skip-stop plan. The plan of loading and unloading passengers in the middle of blocks in the downtown district was ordered at the same time as the skip-stop plan, but was abandoned after having been in service a few days.

Cut in Fares Announced.—The New Jersey & Pennsylvania Traction Company, Trenton, N. J., announces a cut in passenger and freight rates between Trenton and the various towns it covers in Bucks County, Pennsylvania. The fare on the Morrisville division has been 7 cents when tickets were purchased at the rate of five for 35 cents. Under the new rate five tickets will be sold for 30 cents; on the Lambertville division, covering 18 miles four tickets for $2. On the Yardly, Newtown and the Bristol-Doylestown divisions six tickets are sold for 50 cents. The new rates will go into effect on March 15.

Higher Rates Suspended for Hearing.—The Mobile Light & Railroad Company, Mobile, Ala., must defer putting into effect its 8-cent cash fare with a 2-cent transfer charge. The commission issued an order recently suspending this proposal of the company for a hearing on March 15. The company's proposed increases, which were sought to become effective on April 15, allowed an increase of one cent in the regular fare with the privilege of buying seven tickets for 35 cents. School tickets would be offered at the rate of forty for $2 and fifty for $2.50.

Ask That One-Man Cars Be Abolished.—At a hearing before the electric railway committee of the Massachusetts Legislature, three legislators asked that one-man cars be abolished. It was alleged that the number of accidents on one-man cars was too high to permit their continued use. The committee is conducting hearings on several bills which would require two employees on each car. Homer Loring, chairman of the public trustees of the Eastern Massachusetts Railway, said that enforcement by the state of the provisions of the bill would force 300 miles of trolley to be abandoned in the state.

One-Man Car in Downtown Boston.—Boston (Mass.) Elevated Railway is now operating a one-man car in the business district of Boston between Franklin and Washington Streets and Rowes Wharf. It is designed to serve the business people who come to the city by the Boston, Revere Beach and Lynn Railroad and who cannot reach the business district except by an involved route and a 10-cent fare. The fare between Rowes Wharf and Franklin Street is 5 cents. Transfer privilege may be had for an additional 5-cent fare, which also includes service beyond Franklin Street. No other one-man car is operated in the downtown district.

Personal Mention

F. D. Burpee Elected Director

Manager of Ottawa Electric Railway Has United Support of City and Company

To F. D. Burpee, who, as manager of the Ottawa (Ont.) Electric Railway, has had much in the way of electric railway honors, more was recently given when he was elected a director of the Ottawa Traction Company, Ltd. This new mark of appreciation brought forth enthusiastic newspaper comment which showed that Mr. Burpee is one of the first in the hearts of his townsmen.

His election as a director is an acknowledgment of his brilliantly successful work in connection with the vote on municipal purchase of the railway. To him chiefly is attributed the creation of a favorable public attitude toward the utility company so that at the plebiscite in Ottawa on Jan. 3 municipal ownership was rejected by a vote of 8,430 to 6,003. The vote for the extension of the franchise stood 8,415 in favor of it to 6,070 against it. The company therefore stands four square in its position with the general public.

Mr. Burpee's method is one easily stated, but hard to follow consistently. His rule is that of the old wag who advised his friend to do unto others, but to do it first. This, being interpreted into terms of electric railway managing, means that Mr. Burpee manages the utility as he would wish it to be managed were he the public.

Needless to say he has been successful and popular as a traction executive, for he has persistently spread this doctrine throughout the company. Not only has his own organization been aware of Mr. Burpee's success, but the *Ottawa Journal*, expressing the public attitude in an editorial on Feb. 8, spoke of him as follows:

> Mr. Burpee kept up the service in face of difficulties and cemented the good will of the people. He also discussed the problems of the future in a way that was considered fair and reasonable. . . . So successful has he been that the *Journal* hoped before the plebiscite was voted on that should the city take over the street railway he would be retained as commissioner to assist in running it for the city.

Could any one, after that, doubt that Mr. Burpee has entrenched himself firmly in Ottawa?

Mr. Burpee's railway experience has been very largely with the Ottawa Electric company. From 1891 to 1893 he served with the Canadian Pacific Railway, but since then has been in the employ of the Ottawa Electric Railway. Within five years he was made assistant to the superintendent and secretary-treasurer and in 1912 he succeeded Col. J. E. Hutcheson as superintendent. After the war, during which, as major, he constructed narrow and standard gage railways on the British front, he continued his work as superintendent. Since 1920 he has been general manager.

Louisville Employee Is Director

Another milestone in electric railway history was erected when the Louisville (Ky.) Railway on Feb. 8 held an election at which employees of the company balloted on one of their number to serve as a member of the board of directors. Damon L. Kehl, clerk in the construction department, received 481 of the total of 1,106 ballots cast. Approximately 1,250 votes were possible.

The polls were open from 1 to 7 p.m. Voting places were established in twenty-three locations on the company's property, and a committee acted as teller at each voting place. The sealed ballot boxes were turned over to F. H. Miller, vice-president of the company and chairman of the election committee, and L. H. Broadus, secretary of the Co-operative Association, who were tellers.

D. L. KEHL

The six candidates for the post of director were members of the general committee of the Co-operative Welfare Association. Those competing for the post, besides Mr. Kehl, were John Peters, conductor; Chester Diersing, clerk in the cashier's department; George Brockers, member of the shops force, Gus Schmitt, conductor, and J. E. Burdon, of the motive power department.

Election is for a period of one year. Mr. Kehl attended his first directors' meeting Feb. 5.

Mr. Kehl has been with the company for more than five years, all of this time in the construction department. Mr. Kehl's previous work has been with newspapers. He became a reporter for a paper in Connersville, Ind., his home, and in the following year was made city editor. This position he filled competently for six years, when he joined the reportorial staff of the *Commercial Tribune*, Cincinnati, Ohio. Mr. Kehl was a machinist before he became a reporter.

Employees of the company have expressed satisfaction with the election. In Mr. Kehl they feel that they have a man who will represent their interests capably and who will be able to judge what is to the advantage of company and employees alike.

H. C. Couch Heads Two Companies

Scores Financial Success for Pine Bluff Organizations During Period of Depression

The extensive ramifications which the Pine Bluff Company and the Arkansas Light & Power Company, Pine Bluff, Ark., are attaining under the presidency of H. C. Couch call attention once more to the fact that Mr. Couch has achieved remarkable success as a utility head. An added testimonial is his recent election as president of the Pine Bluff Chamber of Commerce.

With $100, Mr. Couch approached the utility field as a capitalist. His courage was of course disproportionate to the amount of money at his command, but with the two he organized a telephone company at Bienville, La., and thus realized a dream of days when he had been a railway mail clerk and had watched long distance telephone lines being stretched across the country. Eight years after the formation of his Bienville project, Mr. Couch sold the telephone company for the sum of $1,500,000 to the Southwestern Bell Telephone Company.

Then the light and power game lured the utility adventurer. Speaking of it, he says: "I felt that the biggest opportunities come in building up rather than in tearing down, and that opportunity comes quickest when you are out looking for it. The electric light and power game seemed to offer just what I was looking for. I started first with forces in Malvern, then Arkadelphia, Camden, and Magnolia, all in Arkansas, and organized them into a company in the year 1914."

At present the big central station in Pine Bluff is the center from which power is furnished to a score or more of towns and industries in various sections of the state. Power is furnished also to the residents of the rice farming district.

The electric railway in Pine Bluff has been built up until it is a paying proposition. Most of the success of the two companies headed by Mr. Couch has been achieved in years of war and industrial depression. Every financial difficulty has been tided over, and dividends are being paid regularly. The company charges a seven-cent fare, and gives pleasing service to the people. It operates one-man cars.

One of Mr. Couch's hobbies is the wireless telephone. He has experimented with this new commercial convenience and has just recently had an outfit of this kind installed at the Pine Bluff office.

During the war he acted as state fuel administrator for Arkansas.

Philip Seabury Smith, electrical engineer and, until Feb. 1, chief of the Latin-American Division of the Bureau of Foreign and Domestic Commerce of the United States, has joined the staff of *Ingeniería Internacional*, a McGraw-Hill publication, as associate editor. Mr. Smith has had extensive experience, not only in the United States but in South America. As associate editor of *Ingeniería Internacional* Mr. Smith will aid in developing a better understanding in the Latin-American countries of American Engineering methods.

S. L. Vaughan, traffic manager of the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., was elected a vice-president of the company at the last meeting of the board of directors. Mr. Vaughan will act as general manager of the company during the absence of M. K. Morley, president, who is leaving soon for an extended trip.

Obituary

John T. Darrison, Lockport, N. Y., former treasurer of the Buffalo & Lockport Railway, now known as the Lockport division of the International Railway, Buffalo, died on Feb. 5. He was sixty-six years old. At one time he was Mayor of Lockport and then Assemblyman from a Niagara County district. He was vice-president of the Farmers & Mechanics Savings Bank, Lockport.

Sylvester T. Everett, one of the country's pioneers in the promotion and construction of electric railway lines in the United States, died at his home in Cleveland, Ohio, recently, at the age of eighty-three. Mr. Everett built in Akron one of the first successful electric railway lines in the world. His brother, the late Henry A. Everett, was one of the organizers of the Northern Ohio Traction & Light Company, which now operates the system in Akron and also an extensive interurban state system. When Senator Marcus A. Hanna controlled the Cleveland City Railway, Mr. Everett was a director. He also promoted a railway system in Erie, Pa., and was instrumental also in building several extensive steam roads. Since 1877 Mr. Everett had been conspicuous as a financier, founding a number of Cleveland banks. His political activities were equally noted. In 1888 Mr. Everett was a presidential elector, and as a delegate to the St. Louis Convention he assisted in the nomination of his friend, William McKinley, for President of the United States. Mr. Everett was a charter member of Cleveland's Union Club. Among his friends he numbered Presidents Lincoln, Garfield and McKinley and Chauncey M. Depew, Andrew Carnegie and the late J. P. Morgan.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

New Engineering Corporation Formed

William McClellan, Peter Junkersfeld and Horace T. Campion have formed a new firm for engineering and construction work. Offices are temporarily at 141 Broadway, New York City. The new organization will specialize in power plants, transmission systems, water powers, electrification of railroads, and general industrial and utility engineering and construction. Mr. McClellan gained his early experience as engineer in charge of construction with the Philadelphia Rapid Transit Co. For several years he was a managing engineer with Westinghouse, Church, Kerr & Company, participating in the Pennsylvania Terminal engineering and the construction and electrifying of the Rochester division of the Erie Railroad.

Colonel Junkersfeld was associated with the Chicago Edison Company, and its successor, the Commonwealth Edison Company, from 1895 to 1919, and following this he was president of the Association of Edison Companies. In 1907 he entered the army and was engaged in the construction of cantonments. Since the war he has been engineering manager for Stone & Webster.

Mr. Campion's early experience was gained through work with the Philadelphia Rapid Transit Company, where he was assistant chief engineer in charge of the design and construction of carhouses, power houses, etc.

Since 1903 he has been engaged in general construction work.

Brooklyn Will Spend $1,500,000 on Track

The budget of the surface lines in Brooklyn for 1922 includes an approximation of $1,500,000 for track improvements. The order for rail has already been placed. It was obtained by the Bethlehem Steel Company, which will supply 5,000 tons. The type ordered is the 7-in. American Electric Railway Association standard grooved rail. The contract for ties has not yet been awarded. The engineers of the Brooklyn surface lines are also figuring on special work layouts for this year. The cost will be between $80,000 and $100,000.

Big Increase Reported in Power Apparatus Sales

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces a marked increase in the sale of large power apparatus in 1922, with January sales of $1,500,000 in turbine-generators and condensers. Some of the companies purchasing this apparatus were Pennsylvania Edison Company of Easton, Pa.; The Madison (Wis.) Gas & Electric Company; The North Carolina Light & Power Company.

Takata & Company, Japan, have ordered another large turbine-generator for one of their new plants.

Fifty steam auxiliary units were sold during the month for a wide range of applications, many of the purchasers bting industrial power plants.

Swedish Electric Locomotives for France

The Allmänna Svenska Elektriska Aktiebolaget has recently secured a contract from the French State Railways for construction of thirty electric locomotives at the company's works at Vasteras.

Reorganization in Personnel of Curtain Supply Company

Owing to the increase and expansion of the business of the Curtain Supply Company, Chicago, Ill., it has been found necessary to make a number of changes in the personnel.

T. W. Holt, heretofore secretary and general manager, has been elected a vice-president of the company in charge of all operations of the company, with headquarters remaining in Chicago. Ross F. Hayes, heretofore eastern sales manager, with headquarters in New York City, has been advanced to the position of general sales manager in charge of the entire sales of the company, with headquarters in Chicago. T. P. O'Brien has been appointed district sales manager in charge of the eastern sales, with headquarters at the New York office, 50 Church Street. Ralph Brown has been appointed district sales manager for the Western district, with headquarters in Chicago.

The changes indicated have been due to the increased lines taken on by the company, as well as to the normal expansion of the business.

Metal, Coal and Material Prices

Metals—New York	Feb. 21, 1922
Copper, electrolytic, cents per lb.	12.875
Copper wire base, cents per lb.	14.625
Lead, cents per lb.	4.70
Zinc, cents per lb.	4 83
Tin Straits, cents per lb.	29.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.575
Somerset mine run, Boston, net tons	1.875
Pittsburgh, mine run, Pittsburgh, net tons	2.15
Franklin, Ill., screenings, Chicago, net tons	2.00
Central, Ill., screenings, Chicago, net tons	1.80
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y. cents per lb.	6.00
Weatherproof wire base, N. Y., cents per lb.	15.75
Cement, Chicago net prices, without bags	1.97
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	94.00
White lead, (100-lb. keg), N. Y., cents per lb.	12.25
Turpentine (bbl. lots), N.Y., cents per gal.	90.00

Increased Demand for Fuses

Most manufacturers of fuses report an increase in sales over six month ago with the prospect of a further increase in sales during the spring. The majority of producers appear to be working on a 10 per cent to 15 per cent better basis than that of last September, and one manufacturer reports doing double the business of six months ago.

The increase in building construction is one of the principal causes of this improvement. Other factors in bettering conditions have been an easier financial market, greater confidence in prices, and absorption of overstock, permitting dealers and jobbers to order up to their requirements. Deliveries of raw materials to manufacturers and of the finished product to jobbers and dealers were never better.

Prices have been fairly well established since Jan. 1, though there are some who claim that the absence of price change is merely a lull between price wars. This view is not widespread. It is true that the fall of 1921 saw as keen competition in this market as has been experienced in years, but there is little doubt now that manufacturers and jobbers have about reached bottom and that it would be suicidal to go further on the price-cutting path. There may and probably will be some adjustments still, but it will result from economy of manufacture or distribution and not from a desire to make sales without regard to profit or loss. It is the general opinion that sales are likely to remain at their present level for the next two months. After that the rise of the sales curve should be rapid and continuous.

Ties Exported During 1921

Commerce reports for Feb. 6, 1922, state that a total of 3,149,788 railway ties were exported during 1921. The principal markets were: Canada, 1,423,915; United Kingdom, 610,318; Mexico, 350,000; Honduras, 222,828. Cuba, Peru and a few other countries took the balance.

Commercial Engineering Conference Called

A second public conference on commercial engineering is being called by the United States Commissioner of Education to be held May 1 and 2 at the Carnegie Institute of Technology in Pittsburgh, Pa. A committee on commercial engineering has been in existence for some time. It was appointed by him to investigate business training of engineers and engineering training for students of business. The conference will consider the work of the commission and amplify it. The first conference was held in 1919.

The present conference will deal with the new problems in modern industries including job analysis and personnel specifications and the translation of these into units which can be taught; the training of the engineers for treating problems of community development, and for managing over-seas projects.

Track and Roadway

Philadelphia, Pa.—Sealed proposals for block signals and interlocking for the Frankford Elevated Railway will be received at the Director's office, Department of City Transit, until Jan. 31.

Northwestern Ohio Railway & Power Company, Toledo, Ohio, is building a sidetrack to the American Cement Plaster Company plant, at Port Clinton. It is planned by the company to move much of its product over the electric line through Toledo.

Mount Airy, N. C.—Preliminary plans were formulated recently for financing the construction of an electric railway from Sylvatus, Va., to Mount Airy. The line would be a standard gauge and fully equipped for heavy traffic. The route would be from Sylvatus via Hillsville and through Ward's Gap.

Oklahoma Railway, Oklahoma City, Okla., has proposed to build an interurban line from Guthin to Stillwater. A survey is now being made. General Manager Shartel also includes in his plan for the extensions from Stillwater to Yale, Cushing and other places contingent upon these towns participating in the financing of the line.

Houston (Tex.) Electric Company—will have its new tracks on Fannin Street completed by April 1, according to W. E. Wood, vice-president and general manager. The service on Fannin Street will be given a trial of ninety days before the tracks on Main Street are removed, according to the agreement between the officials of the traction company and of the city.

Power Houses, Shops and Buildings

Jamestown (N. Y.) Street Railway will remodel the old Lyric Theater Building so as to be suitable for a terminal.

Corpus Christi (Tex.) Railway & Light Company has purchased a 60-kw. steam turbine which is now being installed in the plant in Corpus Christi. This plant was recently destroyed by fire, putting the street car lines and light and power system out of commission. The electric railway lines will not be operated until the new generator is installed, according to E. H. Eldridge, general manager.

Southern Power Company, Charlotte, N. C. has closed a contract with S. Morgan Smith Company of York, Pa., involving water power construction amounting to $10,500,000. It was learned that the contract was closed Dec. 15, 1921. Carey A. Etnier, a representative of the S. Morgan Smith Company, negotiated the deal. The contract embraces the building of a dam which will cost $8,000,000 and a power house in North and South Carolina for the Watever Electric Company and the Great Falls Power Company, both of Charlotte, and subsidiaries of the Morgan Smith Company will supply the turbines and other power and operating machinery, costing $1,250,000.

Trade Notes

Medart Patent Pulley Company, St. Louis, Mo. has changed its corporate name to The Medart Company. This company handles everything in line shafting equipment.

Wilson Welder & Metals Company, Inc., New York, N. Y., manufacturers of Arc Welding Machines and Certified Welding Metals announces the appointment of R. L. White as district manager in charge of Detroit Office, 809 Kresge Building, Detroit, Mich.

W. McK. White, Goshen, Ind., has been appointed western sales representative by the American Rattan & Reed Manufacturing Company, of Brooklyn, N. Y. Mr. White will handle the sale of rattan products made by this company in conjunction with the products of the Columbia Machine Works & Malleable Iron Company.

Rathbun Jones Engineering Company, Toledo, Ohio, has appointed the Ingersoll-Rand Company, New York, general sales agent for Rathbun Gas Engines. The large sales organization and service department of the Ingersoll-Rand Company, combined with the fact that gas engines are used to drive compressors, pumps and other machinery which it manufactures, places it in a position to serve better the users of gas engines and other machinery. Rathbun Gas Engines are of the vertical, multi-cylinder type and are built to operate on Natural, Illuminating, Producer, Coke Oven, Oil Still and other forms of gases which can be successfully handled in an internal combustion engine. Sizes range from 100 brake hp. to 1,450 brake hp.

New Advertising Literature

The Copper Clad Steel Company has issued two leaflets giving technical data and wire tables on their signal wire and copper weld wire for series lighting circuits.

The Esterline-Angus Company, Indianapolis, Ind., has issued Bulletin No. 122 giving some suggestions in regard to a study of plant operation by the use of graphic recording instruments.

The Bridgeport Brass Company, Bridgeport, Conn., has issued a folder in regard to its "Ledrite Brass Rod." Advantages claimed for this are less tool wear, greater production and less rejections of finished parts.

The Deschanel Engineering Corporation, New York, has issued a bulletin describing its single line cableway for handling material. It is particularly applicable to the handling of coal, ashes, etc., between boiler rooms, cars and storage piles.

A Sign of Safety
—on More "Safeties"

The
PEACOCK STAFFLESS

A Brake to Meet the Spirit of the Law

Peacock Brakes are not found on every one-man car but they are being specified for an increasingly large proportion of all the new safety cars which are being turned out. They have been found to be the nearest approach in reliability and braking power, to the excellent automatic air brakes and safety devices with which these modern safety cars are equipped.

Do not be content with the installation of any inadequate type of hand-brake merely to fulfill the "letter of the law" at the lowest possible cost. Such a brake may enable the operator to stop the car somewhere—if there's no particular hurry about it! But it's wiser to have something more dependable.

This has been shown over and over again by the experience of many companies which have tried various brakes and finally installed Peacocks after exhaustive tests.

Specify Peacock Staffless Brakes

Let us show you some of the things which others have found out along these lines. Then you will want only Peacock Brakes for your safety cars.

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131 State St. BOSTON

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OUR expander draws a steel "H" beam into an expanded Bates Pole every two minutes.

The process of manufacture is reduced to a scientific minimum.

Each pole is sheared, expanded, hot painted and completed ready to ship in one continuous process.

The result shows in a selling price with which no other steel pole can compete.

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But after all, money talks.

BATES POLE PRICES LEAD

Their Annual Depreciation is Lowest.

Bates Expanded Steel Truss Co.
208 South La Salle Street, Chicago, U. S. A.

Prices will Win in 1922

Add this to Bates Quality, Service and Longevity.

Lookit

Lookit means the once-over or the up-and-down that the natives give the Kabyle bride.

She's staked in the village square for the half day preceding her wedding so that hubby can overhear the comments of the villagers.

Don't you see how that helps him get the best available opinions.

Don't you see how it short-circuits bitter experience.

Why, man, that's the Morganite method of brush prescribing, all over.

We say, "Here's the brush, and here's what the best people in the electrical world say of it—and you can't get opinions of our best people on any other brush—because our best people don't use any other brush."

It's nice to know that the crowd is with you in your choice. Morganite! Lookitup.

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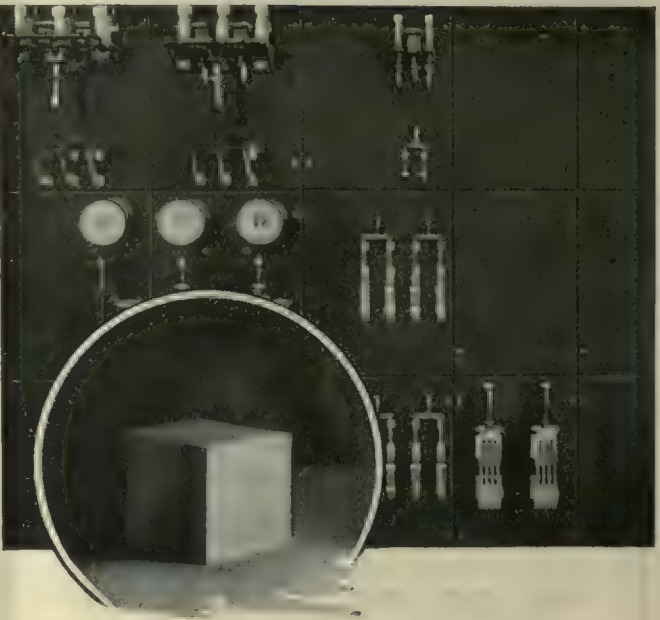

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CONSIDER a switchboard material with 160,000 times the insulation resistance of slate, 16,000 times that of soapstone and 28 times that of blue Vermont marble.

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Ebony Asbestos Wood is a laboratory quality insulating base made available for general use by low cost. It is made of Asbestos rock fibre cemented and impregnated with a special insulating compound.

Manufactured by formula, Ebony Asbestos Wood has none of the flaws of quarried materials—no metallic veins or cracks. While light in weight, it is rigid, permanent and tough.

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Ebony Asbestos Wood is replacing slate, soapstone, marble and even porcelain for hundreds of different uses. It is comparatively easy to work, giving it a tremendous advantage where unusual construction is required. *Send for booklet.*

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Branches in 60 Large Cities
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Johns-Manville Service Covers the Continent
Through
ASBESTOS
and its allied products
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Ebony Asbestos Wood

Griffin Wheel
Company
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Chicago, Ill.

GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

All of our plants have adequate facilities for fitting wheels to axles

FOUNDRIES:

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Denver
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Kansas City
Council Bluffs
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"Something Just As Good"

It's the old story of the corner druggist and the patent medicine—he offers you a substitute which he *claims* is a just as good.

So it is when the silver-tongued voice of well-meant but misdirected zeal for economy suggests reconstructing your old cars, instead of getting new light-weight, one-man safety cars. The former can't be just as good, because they are too heavy, too slow and too expensive to maintain.

Do the job right—get quotations on St. Louis Quality Safety Cars.

St Louis Car Company
St. Louis, Mo.

"The Birthplace of the Safety Car."

—*on electric railway lines*

Pittsburg INSULATORS

Guarantee Reliable Service

Your high-voltage lines are the very nerves and sinews of the transportation system. They must not fail!

Pittsburg Insulators have justified their existence on hundreds of transmission lines throughout the world because of their long life and low maintenance cost. They have given exceptional service in every kind of operation.

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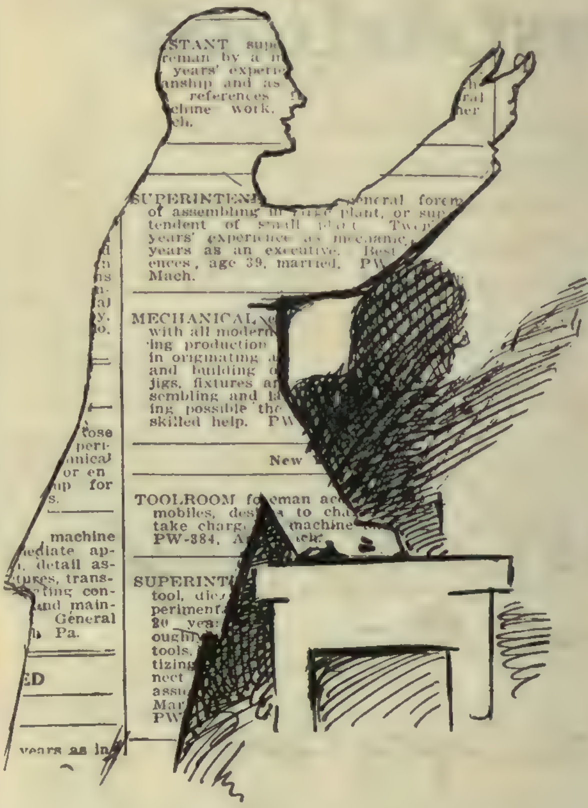

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They go direct to those in the industry you wish to reach and tell your story in a forceful and business-like way.

They don't mince words but get right to the point.

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- Foreign Business
- For Exchange
- For Rent
- Franchises
- Help Wanted
- Industrial Sites
- Labor Bureaus
- Machine Shops
- New Industries Wanted
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- Patent Attorneys
- Patents For Sale
- Plants For Sale
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For Every Business Want "Think* SEARCHLIGHT *First"

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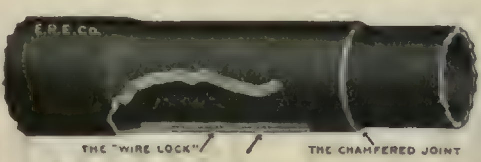

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COMBINE
Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

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BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
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Reg. U. S. Pat. Office
Galvanized Iron and Steel Wire and Strand
Incandescent Lamp Cord

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PHILLIPSDALE, R. I.

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Copper Wire
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Flood City Mfg. Co., Johnstown, Pa.

The Most Successful Men in the Electric Railway Industry read the

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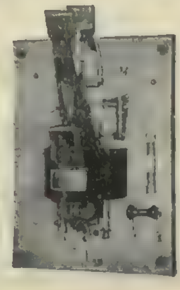
The Circuit Breaker with Brains



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LET'S GET ACQUAINTED

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for
Single-track block-signal protection
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Proceed signals in street reconstruction work
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Highway Crossing Bells
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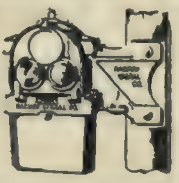

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Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.

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289-93 A Street, Boston, Mass.
Established 1877
Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago 105 So. Dearborn St. London, E. C. 4, 38-38 Upper Thames St.

In the long run

there's
greater safety
greater service
greater economy
in

CARNEGIE
Wrought Steel
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Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
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Arc Weld and Flame Weld

Send for new
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American Steel & Wire Company
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High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

New York Switch & Crossing Co.
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SPECIAL TRACKWORK
Of the well-known WHARTON Superior Designs *and* Constructions

STEEL CASTINGS CONVERTER AND ELECTRIC
FORGINGS DROP, HAMMER AND PRESS
GAS CYLINDERS SEAMLESS STEEL

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(Subsidiary of Taylor-Wharton Iron & Steel Co., High Bridge, N. J.)
ORIGINATORS OF
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Transmission Line and Special Crossing Structures, Catenary Bridges
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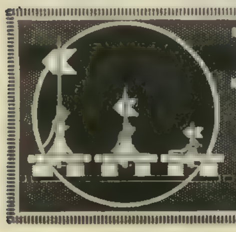

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Automatic Return Switch Stands for Passing Sidings
· Automatic Safety Switch Stands ·
Manganese Construction · Tee Rail Special Work
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Plants at Hillburn N.Y. and Niagara Falls N.Y. · New York Office 30 Church St.

Peirce Forged Steel Pins with Drawn Separable Thimbles
Your best insurance against insulator breakage
Hubbard & Company
PITTSBURGH, PA.

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

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Bayonne, N. J.
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Established 1858

Manufacturers of
Special Work for Street Railways

Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
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SPECIALISTS
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Design and Manufacture
of
Standard—Insulated—and
Compromise Rail Joints.

The Rail Joint Company
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SUPER-SEASONED FIBRE

Peerless Insulation Paper has 25 to 50 per cent higher electrical resistance.

S-S
TRADE MARK

Hornflex Insulation Paper has no grain. Folds without cracking.

NATIONAL FIBRE & INSULATION CO.
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BUCKEYE JACKS
high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
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BAKELITE-DILECTO
The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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Los Angeles Office, 411 S. Main St.
CANADIAN OFFICE, 89 Wellington St., W., Toronto, Ont.

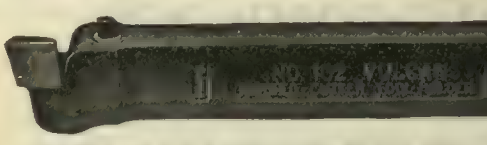
RWB DYNAMOTORS
FOR
CARBON ARC RAIL JOINT WELDING
CARBON ARC RAIL BONDING
CARBON and METALLIC ARC GENERAL WELDING
Rail Welding and Bonding Co., Cleveland, O.

SPECIFY
THE TERRY TURBINE
For Driving Your Auxiliaries
TERRY STEAM TURBINE CO.
Hartford, Conn.

THE CUTTER ELECTRICAL AND MANUFACTURING CO.
CIRCUIT I-T-E BREAKERS
PHILADELPHIA

I. T. E.
Circuit Breakers
for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

FOSTER SUPERHEATERS
A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK
Boston Philadelphia Pittsburgh Kansas City Dallas Chicago San Francisco London, Eng.



WILLIAMS' "VULCAN"
Forged-Cutter
TOOL HOLDERS
For continuous heavy cuts at high speed on lathe, planer, shaper, etc.
LITERATURE?
J. H. WILLIAMS & CO.
"The Drop-Forging People"
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MACHINE TOOLS
FOR ELECTRIC RAILWAYS
Axle Lathes
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Car Wheel Lathes
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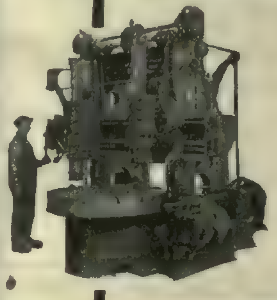
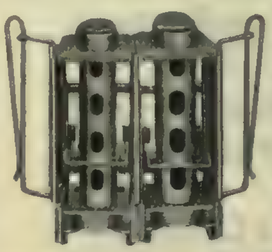


JOHNSON Universal Changer
Adjustable
The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.
Flexible
Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.
JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.



Type R-10
International Registers
Made in various types and sizes to meet the requirements of service on street and city system.
Complete line of registers, counters and car fittings.
Exclusive selling agents for HEEREN ENAMEL BADGES.
The International Register Co.
15 South Throop Street, Chicago, Illinois

THE CLEVELAND
is the practical fare box for
Service at Cost
Let us tell you why.
The Cleveland Fare Box Co.
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A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
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HACKSAW
HIGH SPEED
GLADIUM
ECONOMY
EFFICIENCY
BLADES
GLADIUM CO. Inc. 34 Cliff St. New York

STERLING VARNISH
—that next order
Let us tell you what other roads are accomplishing with Sterling Varnish—in the way of lowering maintenance costs and improving operation.
Consult us about a trial.
The Sterling Varnish Co., Pittsburgh, Pa.

FORD TRIBLOC
A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.
FORD CHAIN BLOCK CO.
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Indicating Signals
Mechanical Sanders
Ventilators, Smokestacks
Pneumatic Sanders
Selector Switches, Lanterns, etc.
THE NICHOLS-LINTERN CO.
8404 Lorain Ave., Cleveland, Ohio

ELECTRIC HEATER EQUIPMENTS
GOLD CAR HEATING & LIGHTING CO. NEW YORK CITY PATENTED
THERMOSTAT CONTROL EQUIPMENTS
Address All Communications to
BUSH TERMINAL
(220 36th St.)
Brooklyn, N. Y.
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ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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POSITIONS VACANT—Business Opportunities and other undisplayed ads. 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment. 4 cents a word, minimum 75 cents, **payable in advance.**

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS WANTED

POSITION wanted as road master or track superintendent by a road master. Have proven ability in all kinds construction and repairs, also special work. References O.K. Desire change. PW-395, Elec. Ry. Journal.

SUPERINTENDENT of transportation, with a fine record of 17 years on large city and interurban properties, desires a change. Capable of taking over details of transportation of any property and operating same in an economical manner. Capable of getting best of results from employees. High grade references from leading men in railway field. Address stating full details. PW-392, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

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Sales Engineer

Wanted high grade resident sales engineer, for special territory for a line of maintenance and construction material for street railways. One familiar with and in high standing with street railways in his territory. AS-393, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

"The House of Dependable Service"

NEW and RELAYING

RAILS

of all Sections

HYMAN-MICHAELS CO.

Peoples Gas Building, Chicago, Ill.

Branch Offices:
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2115 Railway Exchange Bldg., St. Louis
1313 First Nat'l Bank Bldg. Pittsburgh

Write or wire when in the market to BUY or SELL

Please Mention this Publication

PAUL STEWART and COMPANY

First National Bank Building
Cincinnati, Ohio Telephone M 2662

Cable Address - Pasco, Cincinnati
Code Western Union 5 Letter - A.B.C. 4th & 5th Edition

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A1 Units Immediate Delivery

TURBO ALTERNATOR UNITS

1—10,000 kw. Allis-Chalmers 80% P. F. Condensing Turbo Unit, 60 cyc., 3 ph., 2,300-4,600-11,000 volts, 200 lb. I. S. P., 150-200 degrees superheat. Complete with surface condenser and auxiliaries.
1—6,500 kva. Allis-Chalmers Condensing Turbo Unit, 60 cyc., 3 ph., 2,300 volt. Complete layout, including jet condenser and all auxiliaries.
1—3,000 kw. Westinghouse (actual capacity approx. 4,000 kw.) Condensing Turbo Unit, 60 cyc., 3 ph., 2,300-4,400 v.
1—1,500 kw. Westinghouse *Complete Turbo Alternator Station*, 60 cyc., 3 ph., 2,400 volt, 3,600 r.p.m., including Le Blanc jet condenser, boiler plant and building.
1—2,000 kw. Allis-Chalmers Condensing Turbo Unit (actual capacity approximately 3,000 kw.), 60 cyc., 3 ph., 2,300 volt. Complete with jet ondenser and auxiliaries.
2—1,250 kw. Westinghouse Condensing or Non-Condensing Turbines (actual capacity 1,500-1,800 kw.), 60 cyc., 3 ph., 480, 2,300 or 11,000 volts, 1,200 r.p.m. Complete with Le Blanc condensers.
2—600 kw. Westinghouse Non-Condensing Turbo Units, 60 cyc., 2 or 3 phase, 220-480 or 2,400 volts. Units newly rewound and rebladed.
1—500 kw. Westinghouse Condensing Turbo Unit, 60 cyc., 2 or 3 phase, 2,200 volt, 3,600 r.p.m. Complete with surface condenser.
1—1,000 kw. General Electric-Curtis VERTICAL Condensing Turbo Unit, 60 cyc., 2 ph., 2,300 volt, 1,200 r.p.m. Complete with jet condenser.
1—1,500 kw. General Electric VERTICAL Condensing Turbo (actual capacity 2,200 kw.), 60 cyc., 3 ph., 2,300 v., 900 r.p.m. Complete with surface condenser, piping and all auxiliaries.
1—5,000 kw. General Electric-Curtis Vertical Turbo Unit, 60 cyc., 3 ph., 2,300-4,500 volt, 720 r.p.m. Complete with surface ondenser, piping and all auxiliaries. Complete installation.
1—10,000 kw. General Electric VERTICAL Condensing Turbo Unit, 60 cyc., 3 ph., 6,600-11,000 volt, 720 r.p.m. Complete with surface condenser and auxiliaries.
1—10,000 kw. General Electric VERTICAL CONDENSING Turbo Unit, 25 *cycle*, 3 phase, 6,600 volt. Complete with surface condenser and all auxiliaries.
1—1,500 kw. General Electric VERTICAL Condensing Turbo Unit, 25 *cycle*, 3 phase, 11,000 volts.

DIRECT CURRENT UNITS

1—1,500 kw. Westinghouse Engine Type Generator, 220-250 volt, direct connected to horizontal heavy duty cross compound Corliss engine.
1—1,200 kw. General Electric M. P. Engine Type Generator, 250-500 volts, direct connected to tandem compound heavy duty Corliss engine.
1—800 kw. Same as above.

BOILERS

3—350 hp. Stirling B. & W. Water Tube Boilers. 200-lb. allowance. Without grates or stokers.
4—500 hp. B. & W. Steel Header Water Tube Boilers. 12 tubes wide, 21 tubes high. 200-lb. allowance. Complete with stokers and all fittings.
1—500 hp. Stirling B. & W. Water Tube Boiler. 160-lb. allowance. Complete with stoker and fittings.
1—250 hp. Heinie Steel Header Water Tube Boiler. 150-lb. allowance.

ROTARY CONVERTERS

1—500 kw. Westinghouse, 3 phase, 60 cycle, 360 volts A.C.; 600 volts D.C.; 400 r.p.m., with 2—300 kw. Westinghouse 2400/380 volt transformers, also switchboard.

2—300 kw. Stanley, 3 phase, 25 cycle, 360 volts A.C.; 600 volt D.C.; speed, 500 r.p.m.; complete, with suitable transformers, also panels.

1—300 kw. Westinghouse, 3 phase, 60 cycle, 370 volts A.C.; 575 volts D.C.; 600 r.p.m.

MOTOR GENERATOR SETS

2—1000 kw. General Electric Synchronous Motor Generator Sets, each consisting of 1—1000 kw., 600-volt type MPC, 514 r.p.m., D.C. generator, and 1—1400 kva., 3 phase, 60 cycle, 2300/4000 volt, 514 r.p.m. synch. motor.

DIRECT CONNECTED ENGINE UNIT

1—850 kw. Gen. Elec. 575-volt Compound Wound 100 r.p.m. Generator, direct connected to 23 and 54 x 48 Greene Wheelock cross compound heavy duty 4-valve engine, complete with surface condensing equipment and panel; price, f.o.b. cars, $7,500.

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- Collier, Inc., Barron G.

Air Aftercoolers
- Ingersoll-Rand Co.

Air Compressors
- Ingersoll-Rand Co.

Air Motors
- Ingersoll-Rand Co.

Air Receivers
- Ingersoll-Rand Co.

Anchors, Guy
- Electric Service Sup. Co.
- Ohio Brass Co.
- Westinghouse E. & M. Co.

Angle Bar Bolters
- Ingersoll-Rand Co.

Armature Shop Tools
- Elec. Service Supplies Co.

Axles
- Bemis Car Truck Co.
- Cambria Steel Co.
- Midvale Steel & Ordnance Co.
- St. Louis Car Co.

Axles, Car Wheel
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Carnegie Steel Co.
- Standard Steel Works Co.
- Westinghouse E. & M. Co.

Axle Straighteners
- Columbia M. W. & M. I. Co.

Babbitt Metal
- More-Jones Br. & Metal Co.

Babbitting Devices
- Columbia M. W. & M. I. Co.

Badges and Buttons
- Electric Service Sup. Co.
- Internat'l Register Co., The

Batteries, Dry
- Western Electric Co.

Batteries, Storage
- Western Electric Co.

Bearings and Bearing Metals
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- More-Jones Br. & Metal Co.
- St. Louis Car Co.
- Westinghouse E. & M. Co.

Bearings, Center and Roller Side
- Stucki Co., A.

Bells and Gongs
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- Electric Service Sup. Co.
- St. Louis Car Co.

Benders, Rail
- Niles-Bement-Pond Co.
- Railway Track-work Co.
- Western Electric Co.

Bending Apparatus
- Railway Track-work Co.

Boilers
- Babcock & Wilcox Co.

Boilers, Tubes
- Cambria Steel Co.
- Midvale Steel & Ordnance Co.

Bond Testers
- American Steel & Wire Co.
- Rail Welding & Bonding Co.

Bonding Apparatus
- American Steel & Wire Co.
- Electric Service Sup. Co.
- Ohio Brass Co.
- Rail Welding & Bonding Co.

Bonds, Rail
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- Electric Service Sup. Co.
- General Electric Co.
- Ohio Brass Co.
- Railway Track-work Co.
- Rail Welding & Bonding Co.
- Westinghouse E. & M. Co.

Boring Tools, Car Wheel
- Niles-Bement-Pond Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
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- Electric Ry. Equip. Co.
- Electric Service Sup. Co.
- Hubbard & Co.
- Ohio Brass Co
- Western Electric Co.

Brake Adjusters
- Hamilton & Hansell, Inc.
- National Ry. Appliance Co.
- Westinghouse Tr. Br. Co.

Brake Shoes
- Amer. Br. Shoe & Fdry. Co.
- Barbour-Stockwell Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
- Allis-Chalmers Mfg. Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Johns-Manville, Inc.
- National Brake Co.
- St. Louis Car Co.
- Westinghouse Tr. Br. Co.

Brooms, Track, Steel or Rattan
- Amer. Rattan & Reed Mfg. Co.

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- Jeandron, W. J.
- Le Carbone Co.
- Morganite Brush Co., Inc.
- U. S. Graphite Co.
- Western Electric Co.
- Westinghouse E. & M. Co.

Brush Holders
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.

Buses, Motor
- Brill Co., The J. G.

Bushings
- Nat'l Fibre & Insulation Co.

Bushings, Case Hardened and Manganese
- Bemis Car Truck Co.
- Brill Co., The J. G.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
- Elec. Service Supplies

Car Panel Safety Switches
- Westinghouse E. & M. Co.

Cars, Dump
- Differential Car Co.

Cars, Passenger, Freight, Express, etc.
- American Car Co.
- Brill Co., The J. G.
- Cambria Steel Co.
- Kuhlman Car Co., G. C.
- Midvale Steel & Ordnance Co.
- National Ry. Appliance Co.
- St. Louis Car Co.
- Wason Mfg. Co.

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- Electric Equipment Co.
- Transit Equipment Co.

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- General Electric Co.

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- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.
- Eureka Co.
- More-Jones Br. & Metal Co.

Castings, Gray Iron and Steel
- American Steel Foundries
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- Standard Steel Works Co.
- St. Louis Car Co

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- Amer. Brake Shoe & Fdry. Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- St. Louis Car Co.

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- Electric Service Sup. Co.
- Ohio Brass Co.
- Wood Co., Chas. N.

Catenary Construction
- Archbold-Brady Co.

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- Automatic Reclosing Circuit Breaker Co.
- Cutter Co.
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- Anderson Mfg. Co., A. & J. M.
- Electric Ry. Equip. Co.
- Electric Service Sup. Co.
- General Electric Co.
- Hubbard & Co.
- Ohio Brass Co.
- Western Electric Co.
- Westinghouse E. & M. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
- Brill Co., The J. G.
- Ohio Brass Co.
- Western Electric Co.

Clusters and Sockets
- General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Code Signal Systems
- Western Electric Co.

Coil Banding and Winding Machines
- Columbia M. W. & M. I. Co.
- Electric Service Sup. Co.

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- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- General Electric Co
- Westinghouse E. & M. Co.

Coils, Choke and Kicking
- General Electric Co.
- Westinghouse E. & M. Co.

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- Electric Service Sup. Co.
- Internat'l Register Co., The
- Johnson Fare Box Co.

Commutator Slotters
- Electric Service Sup. Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Commutator Truing Devices
- General Electric Co.

Commutators or Parts
- Cameron Elec'l. Mfg. Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Western Electric Co.
- Westinghouse E. & M. Co.

Compressors, Air
- Allis-Chalmers Mfg. Co.
- General Electric Co.
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- Westinghouse Tr. Br. Co.

Compressors, Gas
- Ingersoll-Rand Co.

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- Cambria Steel Co.
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- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Connectors, Solderless
- Frankel Connector Co.
- Westinghouse E. & M. Co.

Connectors, Trailer Car
- Electric Service Sup. Co.

Controllers or Parts
- Allis-Chalmers Mfg. Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Controller Regulators
- Electric Service Sup. Co.

Controlling Systems
- Geneeal Electric Co.
- Westinghouse E. & M. Co.

Converters, Rotary
- Allis-Chalmers Mfg. Co.
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- Western Electric Co.
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- Roebling's Sons Co., J. A.
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- Electric Service Sup. Co.
- Samson Cordage Works
- Wood Co., Chas. N.

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- Amer. Steel Foundries
- Brill Co., The J. G.
- Ohio Brass Co.
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Cranes
- Allis-Chalmers Mfg. Co.
- Niles-Bement-Pond Co.

Cross Arms (See Brackets)

Crossing Foundations
- International Steel Tile Co.

Crossing Signals (See Signals, Crossing)

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Crossings, Track (See Track, Special Work)

Crushers Rock
- Allis-Chalmers Mfg. Co.

Curtains and Curtain Fixtures
- Brill Co., The J. G.
- Electric Service Sup. Co.
- Morton Mfg Co.
- St. Louis Car Co.

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- Johns-Manville, Inc.

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- Archer & Baldwin
- Electric Equipment Co.

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- Electric Service Sup. Co.

Detective Service
- Wish Service, P. Edward

Dogs, Lathe
- Williams & Co., J. H.

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- Nat'l Pneumatic Co. Inc.

Doors and Door Fixtures
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- General Electric Co.

Doors, Folding Vestibule
- Nat'l Pneumatic Co., Inc.

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- Ingersoll-Rand Co.

Drills, Track
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- Electric Service Sup. Co.
- Ingersoll-Rand Co.
- Niles-Bement-Pond Co.
- Ohio Brass Co.

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- Electric Service Sup. Co.

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- Arnold Co., The
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- Jackson, Walter
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- Sangster & Matthews
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- Spooner & Merrill
- Stone & Webster
- White Engineering Corp., The J. G.
- Witt, Peter

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- Ingersoll-Rand Co.
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- Cleveland Fare Box Co.
- Economy Elec. Devices Co.
- Johnson Fare Box Co.
- National Ry. Appliance Co.

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- American Steel & Wire Co.

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- Cleveland Fare Box Co.
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- Western Electric Co.

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- Carnegie Steel Co.
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- Carnegie Steel Co.
- Midvale Steel & Ordnance Co.
- Standard Steel Works Co.

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- Electric Service Sup. Co.
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- Electric Service Sup. Co.
- General Electric Co.
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- Western Electric Co.

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- Smith Heater Co., Peter

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- Smith Heater Co., Peter

Heaters, Car (Stove)
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Electric Service Sup. Co.
General Electric Co.
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(See also Line Material)
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Electric Service Sup. Co.
Flood City Mfg. Co.
General Electric Co.
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Pittsburgh High-Voltage Insulator Co.
Western Electric Co.
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Electric Service Sup. Co.
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Marsh & McLennan

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Carnegie Steel Co.
Rail Joint Co.

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General Electric Co.
Western Electric Co.
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Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

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Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

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Electric Service Sup. Co.
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Ohio Brass Co.
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Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Johns-Manville, Inc.
More-Jones Br. & Metal Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co.

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Wharton, Jr., & Co., Wm.

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Westinghouse E. & M. Co.

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Texas Company, The

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Galena-Signal Oil Co.
Texas Company, The

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Niles-Bement-Pond Co.

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Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Wharton, Jr., & Co., Wm.

Meters (See Instruments)

Meters, Car, Watt-Hour
Economy Elec. Devices Co.

Money Changers
Galef, J. L.

Motor Buses
(See Buses, Motor)

Motormen's Seats
Brill Co., The J. G.
Electric Service Sup. Co.
Wood Co., Chas. N.

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Allis-Chalmers Mfg. Co,
Western Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.

Nails
Cambria Steel Co.
Midvale Steel & Ordnance Co.

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Barbour-Stockwell Co.
Bemis Car Truck Co.
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Hubbard & Co.

Oils (See Lubricants)

Omnibuses
(See Buses, Motor)

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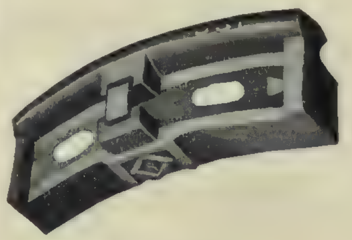

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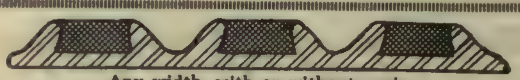

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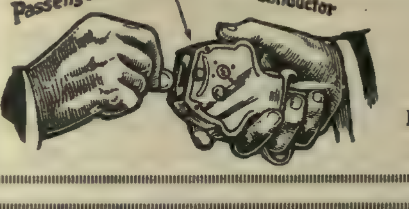

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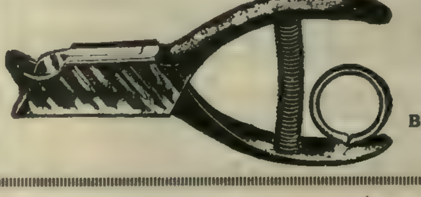

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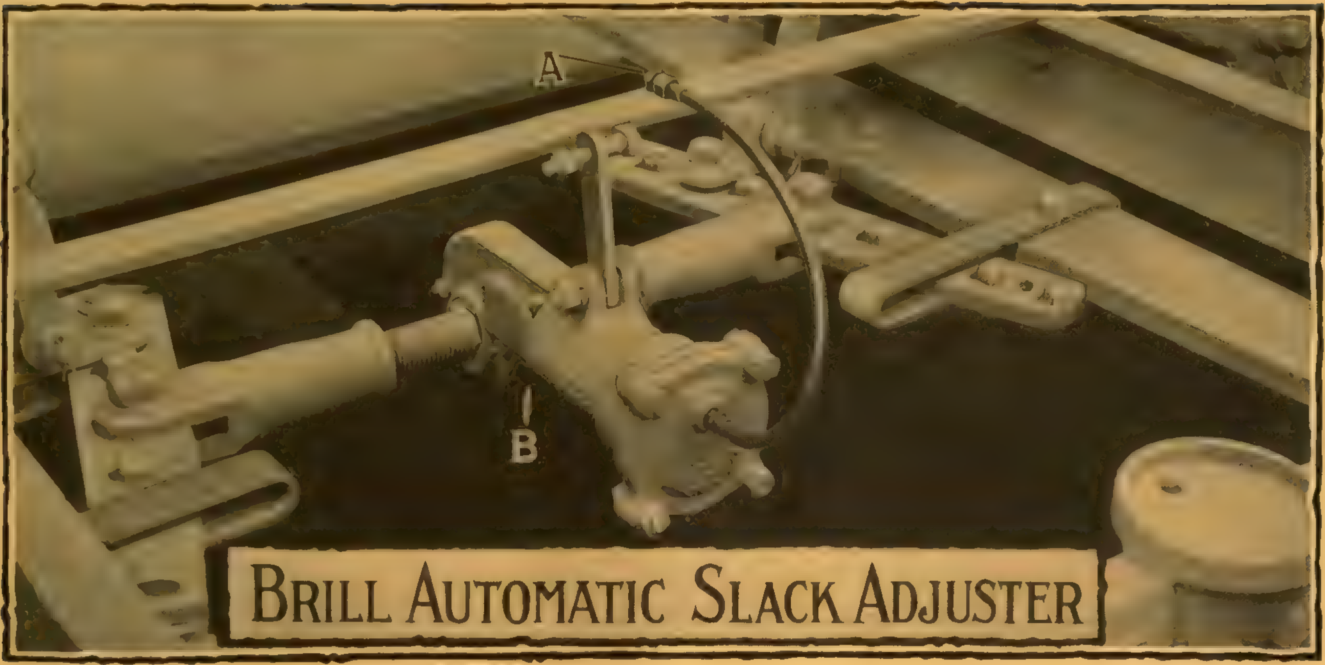

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